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Improved Flour Bolts.

After wheat is ground in flour mills, the flour is separated from the hulls or bran by passing it through a sieve or bolt, which is made of cylindrical form by fastening the bolting cloth around a light frame. The bolt is hung upon an axle with one end a little lower than the other, and is caused to rotate by the machinery. The meal is fed into this cylinder at its upper end, and the bran passes down through and out at the lower end—the fine flour falling through the meshes of the cloth.

Bolting cloths would last many years if they were not destroyed by being eaten by an insect known as the millbug, and the machine here illustrated is intended to protect them from the ravages of these pests. It also prevents moist lumps of flour or dough from collecting in the bolt, and obstructing its operation.

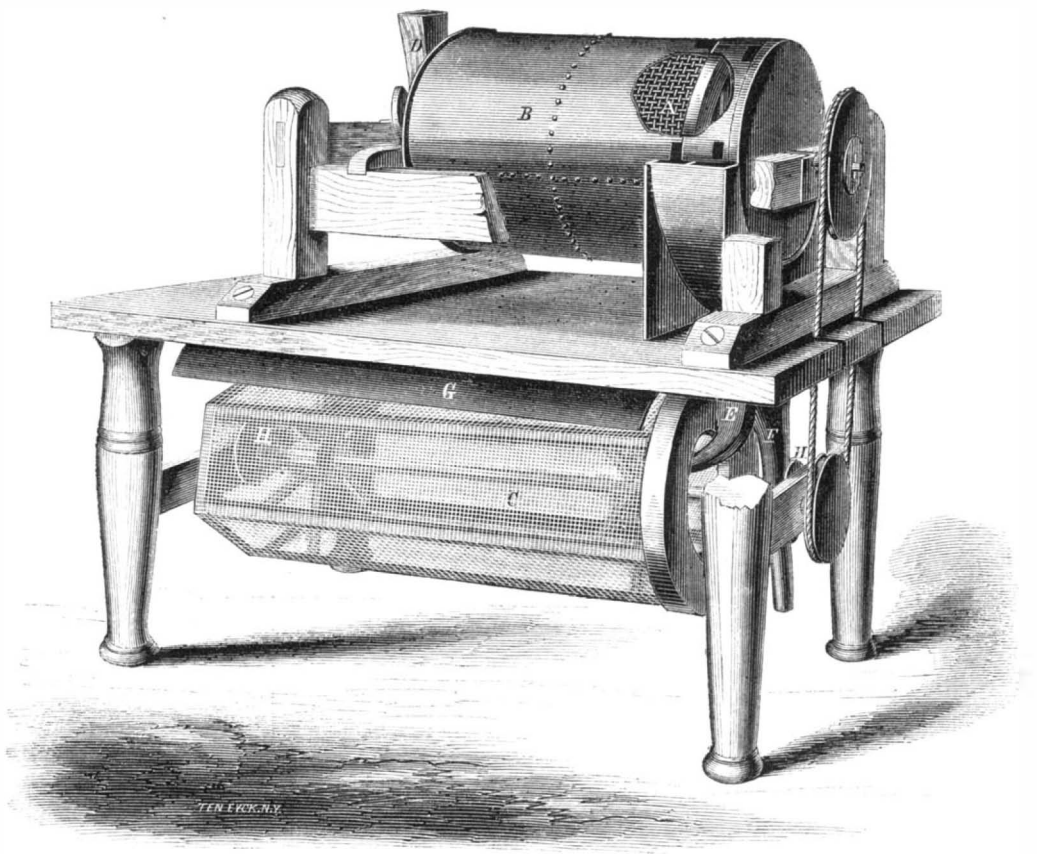
The plan adopted is simply to pass the meal through a wire screen before it enters the bolt; the meshes of the screen being of such size as to retain the millbugs and prevent their coming in contact with the bolting cloth.

The screen, A, is secured in the interior of the cylinder, B, in such manner that both may rotate together, and the cylinder is hung upon an axle in any convenient position above the bolt, C, with one end a little lower than the other. In the cut the cylinder is broken away to show the screen. A tube, D, leads into the interior of the screen at its higher end, and through this tube the meal is poured as it comes from the stones. The flour falls through the meshes of the screen and is conducted to the bolt by the tube, E, while the millbugs, lumps of dough and other large objects pass out of the lower end of the screen into the tube, F.

To prevent bugs from falling upon the outside of the bolt, a curved piece of smooth tin, G, is secured under the frame directly over the bolt; the edges of the tin extending some two inches outside of the diameter of the bolt. Disks, H H, of tin are also secured upon the axles of the bolt.

Besides the greater durability of the bolting cloth resulting from this protection, the labor and inconvenience of patching are also avoided, as well as the damage to the flour which is occasionally produced by lumps of dough falling through holes that have not been promptly detected. The extent and importance of the evils thus overcome are greater than would be supposed. The patching of the cloth not only costs much labor, but it obstructs the operation of the bolt, and diminishes the product of the flour. But the most serious damage is caused by lumps of dough getting into the flour, as the price in market is thus diminished, and the reputation of the mills is injured.

This improvement was invented by David Landis, a practical miller of Lancaster County, Pa. The patent was granted through the Scientific American Patent Agency, October 23, 1860, and further information in relation to it may be obtained by addressing the inventor at Lampeter, Pa., or D. B. Bartholomew, of Lancaster, Pa., who is the general agent for the sale of rights and machines.



LANDIS'S SCREEN FOR FLOUR BOLTS.

MANUFACTURE OF PUDDLED WROUGHT-IRON DIRECT FROM THE ORE—A NEW PROCESS.

Iron is the most useful of all the metals. Every improvement in its manufacture, whereby its cost is reduced, is of general importance. The iron that is employed in the arts is made from a great variety of ores. Pig or crude iron is reduced from ores principally by intense heat in a blast furnace. The oxygen, silica, sulphur and other impurities in the ores separate from the metal when in a fluid condition, and are floated off as slag, the iron being run off into sand molds and formed into long blocks called *pigs*. This iron is not malleable and cannot be forged. Wrought iron is obtained by different modes. By one, called the *Bloomary*, it is made directly from the ore, but it is a costly process, as it wastes a vast amount of fuel, owing to the fire being in an open hearth. The other method is applied to crude and refined pig iron, not ore, and is called *puddling*. It consists in boiling fused pig iron in a reverberatory furnace. Various forms of furnaces are used and different manufacturers vary their modes of operation according to the ores which they smelt. Many efforts have been made to manufacture the same quality of metal direct from the ore, as that obtained by the two systems combined in the blast and the puddling furnaces. After partial success in some instances, and many failures in others, this result appears to have been accomplished, and the process is in practical operation at the Iron Works of Mr. Isaac Rogers, Newark, N. J., where we examined it a few days since. It is entirely different from any other method, so far as we know. In principle, it consists in first roasting granulated iron ore mixed with coal, for several hours in a close revolving cylinder to deoxidize it, then conveying it directly to a puddling furnace, in which it is converted in a short period of time into balls of wrought iron. In Mr. Rogers's Works two roasting cylinders and two puddling furnaces are in operation, and the manufacture of wrought-iron blooms direct from the ore goes on continuously. One cylinder is 16 feet long, the other 20, and both 6 feet in diameter. A description of one will suffice for both. The huge cylinder is hung horizontally in the loft above the puddling furnace. This cylinder is really a large oven, and rotates on a hollow shaft. It is placed in a covered brick arch, and is heated by the waste heat arising through flues from the puddling furnace.—New-Jersey magnetic ore is that which is operated on. It is first ground with about 25 per cent of Cumberland coal, and in this condition it is fed in at regular intervals to the cylinder through an opening in the hollow shaft. During every revolution of the cylinder 25 lbs of ground ore and coal are dumped eight times into the hopper placed over the shaft at one end, and the ore is then carried slowly to the back end of the cylinder by a screw. A signal bell, operated by the engine, warns the attendant when to dump his bucketful of ore into the hopper. It takes from five to eight hours for the ore to pass through the cylinder to the back end. During this period it is turned over frequently, and exposed in thin layers to the heated surfaces of the cylinder. The object of this roasting operation is the deoxidation of the ore out of contact with the atmosphere. Although the ore is thus treated for several hours, as much roasted ore, at a low red heat, is discharged into the puddling furnace at every revolution of the cylinder as makes a common bloom of wrought iron weighing from 110 to 130 lbs. During every 22½ minutes 200 lbs. of mixed roasted ore pass from the revolving cylinder above to the puddling furnace below, and in the same space of time a ball of puddled wrought iron is taken out from the latter, placed under the trip hammer and converted into a bloom. The impurities in the ore melt in the puddling furnace, are separated

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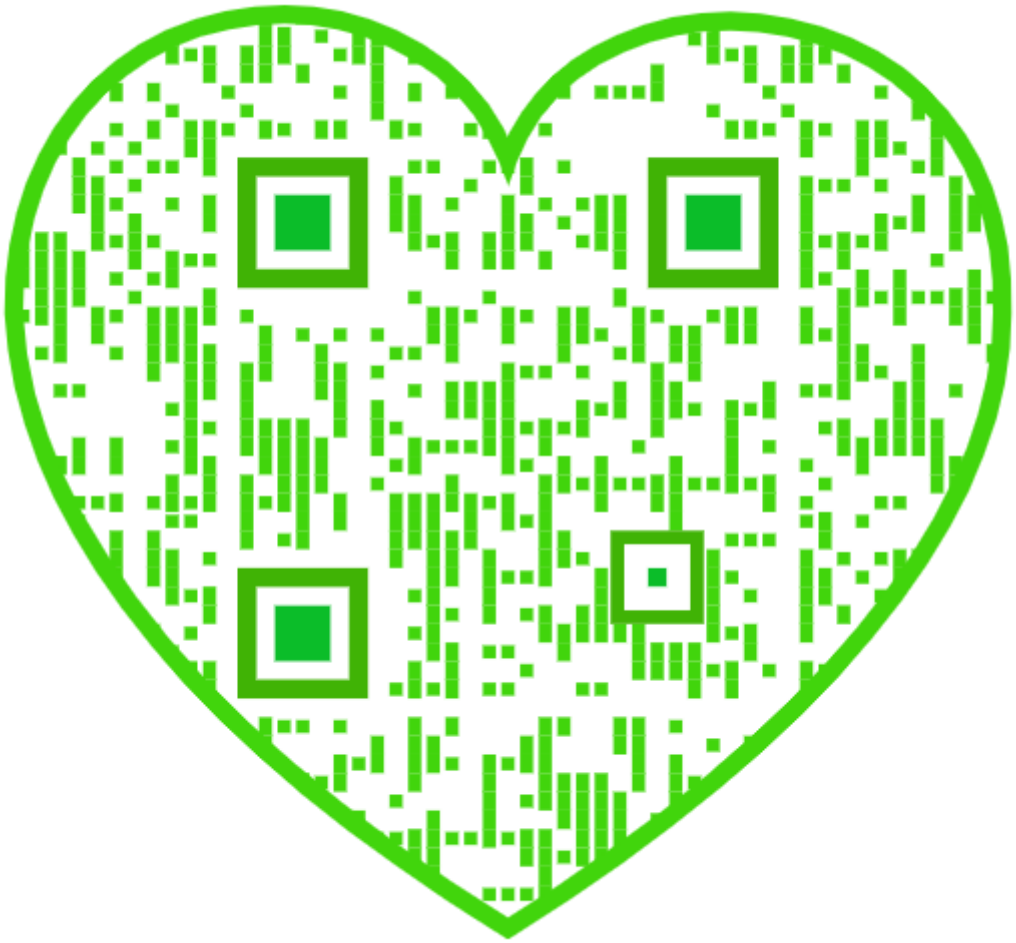

from the iron and flew down into the *spue* hole in the form of slag. We examined good rod and hoop iron which had been rolled from blooms thus manufactured.

Whether this system is equally applicable to other ores we cannot tell. We only relate that it is in practical operation with rich magnetic ores, and these are very abundant. Its advantages may be estimated, in a measure, by stating that it takes about two tuns of coal, by the common method, to make a tun of *pig iron*, while by this method a tun of *wrought iron* is made direct from the ore with less than two tuns of coal, and no skilled labor is required except at the puddling furnace.

NOTES ON MILITARY AND NAVAL AFFAIRS.

THE SITUATION.

Since our last issue nothing of stirring importance has occurred in military matters; but the vast armies in hostile array are by no means idle, and that important movements are steadily progressing there can be no doubt. The press is required to be speechless on this subject, and, in the absence of stirring news, there has come a painful feeling of suspense over the public mind—a leaden dullness, which is oppressive and almost unbearable. After the seven brilliant victories at Mill Spring, Fort Henry, Fort Donelson, Roanoke, Pea Ridge, Newbern and Winchester, which electrified the whole land, there comes a lull. Wall street is depressed, stocks are heavy, and a sort of stupor comes over us all, simply because Island No. 10 holds out, and the week closes without additional victories. It cannot be disguised from all who reflect that we are close on to events that will startle the whole world, and the result of which must determine, in a great measure, whether the government is to maintain its supremacy. The situation of affairs is about as follows: The main forces of the enemy have fallen back on the southwestern railway line, extending from Richmond, Gordonsville and Lynchburg, Va., Knoxville and Chattanooga, Tenn., Corinth, Miss., and Memphis. With the complete control of this important line of railroad both wings of the Confederate army are in easy communication, and reënforcements can be hurried back and forth, as the exigencies of the case may require. Gen. Joseph E. Johnston is commanding in Virginia, and Gen. Beauregard on the Mississippi. Beauregard is not the ablest general in the Confederate service, but he is popular, has the confidence of the Southern troops and can inspire their drooping courage far more than any other leader—even better than Davis himself. It is well ascertained that Beauregard is massing together a very large army—estimated by some to amount to 100,000 effective men. It is also reported that he has withdrawn Gen. Price's defeated army from Western Arkansas to the Mississippi. This movement is effected with facility, by means of steam transports down the Arkansas river to Napoleon, thence up the Mississippi to Memphis. This force is estimated at some 30,000 men, which is a very important element of additional strength. Gen. Curtis will then be left in undisputed possession of Western Arkansas, with a large army, and no enemy to fight except wandering band of guerrillas. Beauregard has also called on all the Confederate Governors in the Southwest to send forward to Corinth and other points every man that can handle a gun, pike, cutlass or an Arkansas toothpick. By these movements he hopes to concentrate a force sufficiently powerful to defeat the army of Gen. Halleck, and push on his victorious legions to Nashville and as far north of that point as he can reach, and thus bring the horrors of war to our own doors. The war has been so long down there, and has wrought such immense mischief to all Southern interests, that they hope by some streak of good luck to transfer it Northward. Some fear is expressed that, with a view to secure success, beyond a doubt Davis will keep up a show of force in front of our lines in Virginia, retreating by railroad, and destroying bridges, culverts, &c., as our forces advance, and thus gradually get the whole army out of Virginia into the Mississippi valley. He knows it would be perfectly safe to leave his towns and cities exposed to the advance of the Federal army, which seeks only to protect them and their inhabitants from violence, and if by this piece of strategy he could defeat us in the West, he might thus secure a compromise and a recognition of his pet Confederacy. This would appear at first sight like a very desperate and hazardous game. Nevertheless it may be played as a last resort. Any thing for success is a rule which Davis has laid down, and since it is understood that he has ordered his paroled troops to take up arms again against the government, when they are in honor bound not to do so, shows the desperate nature of his case. We have great confidence in our generals, but they must use increased diligence, or suddenly some surprise will overtake them. The Union army is very strong, well disciplined and brave, and will do honor to the country, yet it has always been a mystery to us why a strong column has not been pushed through East Tennessee to the line of railway which runs through that section. We suppose it can all be understood and explained by military men, but we have now been at war one year, and still the most important line of railroad connection between the rebellious States is unbroken. Gen. Sherman with his forces could have done the country far greater service in East Tennessee than he has been able to do at Hilton Head. For our part, we do not know what value to place upon the operations at Hilton Head, apart from the brilliant achievements of Com. Dupont. The operations of Gen. McClellan on the Potomac are not yet revealed, but in due time we anticipate something worthy of the gallant commander. He has the best-appointed army ever before marshaled on our soil, and whenever his troops are brought face to face with the enemy there will be some fighting.

Iron-Clad Ships and Big Guns for the Navy.

The following are extracts from the recent important circular of the Secretary of the Navy to the naval committee of the Senate. After stating that sailing vessels are useless for war purposes he says:—

Steam vessels of war, unless protected from the enemy's shot and shell, can make but feeble resistance to, and must surrender when assailed by, an iron-clad vessel. The navy, as it exists at present, cannot successfully contend against a power employing iron-clad vessels, and consequently cannot meet the requirements of the country. I deem it imperative that we should forthwith commence the construction of armored vessels on a scale commensurate with the great interest at stake. The Department, under date of February 20, 1862, advertised for plans, which are now being received, developing the skill and ingenuity of our countrymen, and I have faith they will produce models for a class of vessels for the home defence and for sea service that will secure to our country equality, if not pre-eminence, in naval construction. The heaviest ordnance in present use is not sufficiently heavy and powerful to break and destroy the armature now placed upon vessels; we shall, therefore, be compelled to increase the caliber of our guns until a size be attained which will crush any armature that can be borne by a vessel. I have already given orders to construct fifteen 20-inch guns, but their manufacture is attended with great difficulties, and requires the highest skill to attain success. There are but few establishments in the country willing to undertake the manufacture of these guns, and they can produce but a small number. It is, therefore, earnestly requested that an appropriation of $500,000 be made to extend the grounds and to build furnaces at the Washington Navy yard. The department proposes to construct a few vessels of light draught, great speed, and heavy armament, for the western waters; also, a class for harbor defence, and to operate upon the Atlantic coast and in the Gulf of Mexico, which shall be, as far as possible, invulnerable, each armed with 15-inch guns. And finally, it proposes to attempt an ocean steamer, possessed of the same sailing and armored properties, armed with guns of twenty inches calibre. The two latter classes also to be used as rams. I ask the committee to consider the important subject of procuring iron plates for the armature of vessels. It is believed there are but few, it any, mills in the country capable of rolling plates over two inches in thickness and these cannot be produced in very large quantities. The demands of the government will be likely to raise the price of these plates so as to render the vessels more expensive than under ordinary circumstances would be the case. Under these circumstances shall the government, under proper restrictions, advance money to some well-known establishment, to enable the proprietors to put up the necessary buildings and machinery? Shall one of the navy yards be selected in which to erect the works called for under the change in naval armament, or shall a new point be selected, and the foundation laid for an establishment meeting all the requirements of an iron navy? Forging for heavy shafting is also requisite, and some measures in regard to such an establishment seem indispensable in connection with the other plans suggested. The qualities of iron that may be used for armature is a matter of great importance, the iron produced at some mines being capable of vastly greater resistance to projectiles than others. An investigation, with practical tests as to the quality of iron in different localities, with a view of selecting that which is best adapted to the purposes of government, would be highly useful. I would also request an appropriation of $100,000 for targets and experimental practice. Finally, I would ask that the sum of $30,000,000, including the appropriations already made the present session, be appropriated for iron-clad vessels, heavy ordnance, and plating any naval vessels already in the service, should such a course be deemed advisable.

Firing the Mortars.

The operation of firing the mortars, is interesting. The charge is from fifteen to twenty-two pounds. The shell weighs 230 pounds, and is thirteen inches in diameter. For a family illustration, it is about the size of a large soup-plate. The boat is moored alongside the shore, so as to withstand the shock firmly, and the men go ashore when the mortar is to be fired. A pull of the string does the work, and the whole vicinity is shaken with the concussion. The report is deafening, and the most enthusiastic person gets enough of it with one or two discharges. There is no sound from the shell at this point of observation, and no indication to mark the course it is taking, but in a few seconds the attentive observer with a good glass, will see the cloud of smoke that follows its explosion, and then the report comes back with a dull boom. If it has done execution the enemy may be seen carrying off their killed and wounded.

The "Monitor's" Wrought-Iron Shot.

The solid wrought-iron shot which were made in this city for the 11-inch guns of the *Monitor*, were not used in the fight with the *Merrimac*, because, as we have been informed, they were considered by Capt. Dahlgren (inventor of the guns) too heavy to be fired with safety. The weight of each shot is 187 lbs., or about $\frac{1}{85}$ the weight of the gun, whereas it is not deemed prudent to use shot of greater weight than from $\frac{1}{95}$ to $\frac{1}{100}$ the weight of a gun. The guns of the *Monitor* might have withstood the pressure in firing the solid wrought-iron shot, but discretion dictated a safe practice, for had a gun burst in the turret of the *Monitor*, she would have become the trophy of the *Merrimac*.

GRAIN IN STORE AT THE LAKE PORTS.—The *United States Economist* says:—The accumulation of grain at the stores on Lake Michigan and the upper end of Lake Erie are largely in excess of any previous year. On the 1st of February, there were reported in store at

	Bushels.
Chicago	5,895,305
Milwaukee	3,082,482
Toledo (estimated)	700,000
Detroit	300,000
Racine, Kenosha, and other ports (estimated)	600,000
Estimated receipts for the next three weeks	2,000,000
Total	12,577,787

The Illinois Central Railroad has in store, near Chicago, 700,000 bushels of corn. By the close of this month, there will be 14,000,000 bushels of grain accumulated at the great grain receiving depots.

AN explosion took place in the Chemical Laboratory of L. M. Dornback, corner of Broadway and Fiftieth street, this city, on the night of March 31st. The laboratory was used as a manufactory of guncotton cartridge paper. No person was injured.

A SMALL shoal has just been discovered in the path of American vessels to Vera Cruz, and about 21 miles from the castle of St. Juan de Ulloo. It has only 17 feet of water upon it. Its latitude is 19° 20′ 30″ north, longitude 95° 43′ west.

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NATURAL CURIOSITIES OF CALIFORNIA.

GREAT CAVES—SKULLS WITH DOUBLE ROWS OF TEETH.—A correspondent, Alexander S. Taylor, contributes the following interesting information to the *California Farmer*: Caves of gypsum and other calcareous formations exist in the Sierra Nevada, in the Coast Mountains, in the Santa Barbara islands, and also of other geological formations of both Californias. Indian figures in red color are found in these latter formations in the Carmelo Mountains and elsewhere, and also in Lower California. Painted rocks are found in the Tulare termination of the Estrella Valley not far east of the Mission of San Miguel in San Luis Obispo county. The Indian skulls with double rows of teeth are said to have been found not only abundantly on San Clemente Island caves, but also often still on the neighboring Island of San Miguel, the San Bernardo or Juan Rodriguez of Cabrillo. Obsidian and all species of silicious stones and rocks are exceedingly abundant in all portions of the Californias, Arizona, New Mexico and Utah, as well as of Mexico, and were used by the Indians for various and useful purposes, as knives, razors, swords. The living Colorado Indians use flint arrow-heads, baskets of rushes; some burn the dead, others bury them; they use hot air baths; cutting off the forehead hair, &c. Some of the Colorado Indians (the Yumas and Mohaves) are men of great statue, fine features, and remarkably well made, sprightly, and even bellicose and enterprising.

INDIAN CURRENCY.—The use of the "Wampum," or strings of pieces of different hard shells bored with a hole in the middle, used for money and highly prized as ornaments, extended from Cape San Lucas throughout the Californias and the Old Oregon, and seem also to have made their way extensively among the tribes of the present Utah and New Mexico. The gold miners have often turned up this shell-money at great depths below the surface of the ground. This Indian money and stone arrow-heads are often found in the cemeteries of the Mississippi Valley Indians. Light yellow and sometimes even nearly white tribes with red cheeks, are well known to have extended, and even largely exist now (1860), in parts along the coasts of Vancouver Island and British Pacific America. The Puget Sound Indians use a small shell from Vancouver Island which is found in deep water, for their money.

A correspondent of the San Francisco *Bulletin*, writing from the Humbolt River region, contributes the following curious informarion:—

RIVER OF DEATH.—We have three several climates in this region of country. First in the plains, where in the summer the heat is unremitting and intense. For five tedious months, scarce a breath of wind stirs the sweltering atmosphere, while the sun coming up like a ball of red hot iron, glares fiercely from its rising till its going down. The water, only to be found at long intervals, is little better than poison, being so saline and acrid that it causes serious injury to the system, increasing rather than allaying thirst, while in many places swarms of noxious flies torment the traveler by day, and myriads of mosquitoes by night. In traveling along the Lower Humboldt every one of these evils is found to exist in an aggravated form. A more uninviting country or a more execrable stream, certainly docs not exist on the face of the earth. Some one appalled by its terrors has aptly called it the River of Death; better still, in view of its infernal characteristics, had they named it Phlegethon, the River of Hell. Dark, sullen and turbid, its bitter waters crawl, rather than flow, through its winding and guttered channel like the filthy outpourings of some great sewer. Unlike all other waters its baleful moisture, instead of invigorating and refreshing, seems to blight everything upon which it falls. The broken vehicles and the dry bones scattered all along its banks attest that not without reason has it received the fearful baptism of the River of Death.

THE MIRAGE.—The alkaline particles driven off from the river surface by summer heat floats in the atmosphere and gives rise to the optical illusion known as the mirage, and which is sometimes seen upon deserts in great perfection. It usually takes the shape here of limpid waters and placid lakes, abounding with beautiful islands, and picturesque headlands, instead of "palatial structures" and castellated ruins, as is said to sometimes be the case elsewhere. In crossing the Forty-mile Desert, during mid-summer, one will often have opportunity to witness this phenomenon—it generally being most perfect in the morning. So complete is the illusion, that stock in passing over this fearful waste have been drawn away toward it, as may be seen by the greater number of bones on the east side of the road, where it always shows itself.

SAND CONES.—There is another feature of these plains worthy of notice, and which it has greatly puzzled the curious to account for. Spots are met with, many thousand acres in extent, covered with heaps of sand exactly the size and shape of a large haycock. They stand close together, being from four to ten feet apart, and are formed with much regularity. I think they are the product of whirlwinds, which are very common on these plains, being daily seen eddying across them with great violence. I cannot assert that I have ever seen this formative process following the wake of a whirlwind, but as these may have been more powerful at a former day, and their spiral motion would be more likely to produce such effects than any other agent I can think of, I venture the suggestion, leaving it for the speculations of the ingenious or the researches of the learned to confirm or refute it. Certain it is, being neither ornamental nor useful, these curious heaps were never piled up with shovels or dumped from a steam paddy.

THE MINERAL REGION.—On leaving the plains the climate changes, the atmosphere is cool and pure and the water excellent. The mineral belt on which the mining population reside ranges up the mountain from 100 to 1,800 feet above its base. This may be considered a sort of temperate zone, the climate above being always colder and pretty rigorous in the winter. On a few of the higher peaks the snow lies all summer and varies from two to ten feet in depth in the winter. This snow, lying on the mountains so late in the season, keeps the streams cool and tempers the summer heat in the regions below. The whole of the Great Interior Basin, of which this Humboldt county forms a part, has an absolute altitude of 4,000 feet above the level of the sea. Scattered over this lofty table-land are ranges and clusters of mountains, varying in hight from 2,000 to 4,000 feet above its general surface, the Sierra Nevada forming its western rim, rising in many places to the hight of 6,000 and 8,000 feet. With so great a mean elevation the meteorology of this region is, of course, very unlike that of lower altitudes, the climate being more prone to extremes, and every way more fickle and uncertain. The greater the elevation the deeper the snow, and the further a locality is removed from the mountains the less the aggregate amount of stormy weather. Thus while it will be snowing or raining continuously for days upon the higher ranges, the sun will be shining meantime upon the intervening plains.

WILD OATS.—The indigenous oats (*qvena fatua* of the botanists), which many writers mistakenly suppose is a grain run wild like that of mustard (which is well known to have been introduced, and is an exotic), was also a favorite food among the natives. This California indigenous oat covers hundreds of thousands of acres of hill and plain throughout the surrounding districts of the Bay of San Francisco, and forms one of the most singular features in the diversified scenery of California; for immense stretches of oat-prairies are often seen, without a single tree or bush to obstruct the vision. Its habitat extends from San Diego to the Upper Sacramento, and the mountains east and west, as also the San Joaquin plains and mountains.

THE RODENTIA ANIMALS.—One of the curses of the agriculturist in California and other dry arid countries of Mexico and Pacific America, is the immense abundance of the burrowing rodentia; such as earth squirrels, of different species; and moles, and rats, also of different species. In many districts, not a square yard of land is found without a family of these swarming vermin, which are exceedingly destructive and annoying to the cultivator. No wonder California is full of these enemies: hawks, coyotes, bears, wildcats, lions, and such carnivora; all small gods of the Indian.

THE English coasting trade amounts to 16,000,000 tuns annually, and the foreign trade in English vessels 13,000,000 tuns.

Iron-Clad War Vessels.

Mr. T. Tees, of Philadelphia, has been exhibiting a model of an iron-clad vessel in the Merchants' Exchange of that city. The sides of the vessel run up from the water line at an angle of about thirty degrees to the point where the lower deck commences, and from thence the sides take another angle of thirty degrees to the main deck. The pilot house on the deck is constructed in the form of a pyramid, with the sides inclined at the same angle as those of the vessel. In covering the vessel with the iron-plating, the sharp edge on the sides made by the angles will be protected by plates of steel. The screw and steering apparatus is below water. Mr. Tees proposes to build a vessel upon his model, of 1,190 tuns burden, to be 175 feet long, 52 feet beam and 14 feet hold; the iron plating to be three inches on the side and one inch on the deck; the draught of water to be 12 feet.

Wm. N. Van Wagener, of Newark, N. J., has been publicly exhibiting a model of a new iron gunboat, in this city. It has an inclined deck and a tower nearly like the *Monitor*, but it does not revolve. He proposes the following dimensions for a sea-going iron-clad boat. The hull to be two hundred feet long, sixty-five feet extreme beam, tapering to a sharp point at bow and stern. The lines are alike, stem and stern. The tower is to be forty feet in diameter outside, thirty-seven inside, eight feet high on the outboard edges, five feet high amidships. It sets in the vessel, instead of on its deck. She is to be moved by a propeller. The cost of a vessel of these dimensions above mentioned, built on Mr. Van Wagener's plan, he estimates at $250,000.

The Land of Paradox.

The quicksilver in the barometer, I find, will sometimes disappear, like the water in the pipe of the Great Geyser, and even then the weather will be tolerable. But that is as it should be, and quite in keeping with the regions of paradox which we are approaching, where the magnet forgets its affection for the pole; where as many as nine suns have been seen in winter without affording the warmth of one; where the favorite time for thunder and lightning is mid-winter; where a river of to-day becomes a mere fountain of to-morrow, and *vice versa*, where islands rise out of the ocean, and sink down again, as if nothing had happened; where tiny clouds, according to the testimony of veracious travelers, at times swoop down like falcons on the head of the wayfarer and disorder his brains. A land out of which is dug that mysterious surturbrand which geologists have been addling their brains to explain the origin of, but in vain; a land where the people get their wood from the ocean and where ocean cod are taken in inland lakes; where, if you find a stalactite, it is due to fire instead of water; where dark ducks with white rings round their eyes swim in the boiling Geysers—and where ice and fire are often on the best terms with each other. So that fine weather and a low glass are really quite the correct thing.—*The Oxonian in Iceland.*

American Steel Cannon.

The Pittsburgh *Gazette* says:—"When Gen. Fremont was in command of the Western Department he sent an agent to Cincinnati and Pittsburgh, with orders to procure, if possible, some cast-steel field pieces. Fremont, we suppose, not being trammeled with opinions picked up forty or fifty years ago at West Point, thought if there was any advantage in cast steel the Government needed it, and our brave soldiers were entitled to the advantage of its use. He evidently thought also that whatever a Prussian or an Englishman could make, of steel, could be made in Pittsburgh. And he was right. Singer, Nimick & Co., who were just at the time trying some costly experiments in steel guns, agreed to make a single battery of six guns. About the time the battery was finished Gen. Fremont was suspended, and the beautiful pieces of artillery are now lying in the warehouse of the manufacturers. The guns are rifled, 3-inch bore, about 6 feet long, weigh 830 pounds, and to one's eye look perfect. To Pittsburgh belongs the credit of the only cast-steel cannon which have yet been made in the United States. The so-called "Sickles' battery," the "Wiard," are made of puddled or semi-steel."

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POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The regular weekly meeting of the Polytechnic Association of the American Institute was held on Thursday evening, March 27th ; the President, Prof. Joy, in the chair. After some preliminary business, the President announced that the regular subject of the evening was

GLASS.

Prof. Joy—I invited a gentleman to give us the history of the art of making glass, but a short time before the meeting I received a note from him saying that it would be impossible for him to attend ; so if you will allow me I will give a brief sketch of this history myself. The art of making glass dates from immemorial antiquity. The first mention made of it in writing is probably in the Book of Job—in the xxviii. chapter and the 17th verse. In the 12th verse the question is asked, "But where shall wisdom be found? and where is the place of understanding?" and in connection with the question the remark is made in the 17th verse, "The gold and the crystal cannot equal it; and the exchange of it shall not be for jewels of fine gold." Here glass is compared in value with gold and with wisdom. Though known, it was exceedingly rare and costly. It was known to the Greeks and to the Romans, but among them also it was a luxury. The manufacture was introduced into Europe by the Crusaders ; and for a long time Venice had the monopoly of this industry. In the latter part of the 17th century, in France, the manufacture was monopolized by the nobility ; all other persons being excluded from it by law. Though the art of making glass is so old, its chemistry was first understood by a chemist who died in 1847. Berzelius first showed the relations of the composition of glass to chemistry. He ascertained that silica is an acid —silicic acid—and combines with bases to form salts—glass is a double or triple silicate of soda, or potassa, or the oxide of lead, or other metal. By the combination of silicic acid with different bases—either one or more in the same compound—a great variety of glasses may be made, but there are only eight of these varieties that are of any considerable importance. The simplest of these is soluble glass, which is a single silicate of potassa or soda. This article is attracting much attention at the present time, and there is a practical maker of it in the room, who, I hope, will give us an account of the process of its manufacture. Bohemian or crown glass is a silicate of potassa and lime. This variety is used for convex lenses. Window glass is a silicate of soda and lime. Bottle glass is made of very coarse materials ; it is a silicate of soda, lime, iron and alumina. In this phial are specimens of the materials used in making this bottle just as they are mixed at the manufactory. Crystal glass is a silicate of potassa and lead. Flint glass is the same, with a larger proportion of lead. This is the glass used for concave lenses. Enamel is a silicate and stannate of soda and lead ; or the soda may be replaced by potassa. The presence of iron in glass gives it a green or red color. This color may be removed by the binoxide of manganese, but in this case it is liable to return in the course of time by the reoxidation of the iron. In Bond street, in this city, there are old windows in which the glass has a reddish hue, obtained in this way. Will Dr. Stevens give us the geology of this subject?

Dr. Stevens—The silex used in making glass is obtained usually in the form of sand. Formerly all the sand used in this country in glass making was collected on the sea shore. The purity of the sand is of so much importance that a small proportion of impurities has caused glass works to be removed a considerable distance from one locality to another. The Lenox glass works were removed from the eastern part of Massachusetts, in order to be near the pure sand found in Lenox. All the sand used in the glass works of the United States is derived from the older rocks. The Lenox sand belongs to the Taconic system, the very oldest of the fossiliferous rocks. The Oneida county works, the works in Wayne county, and those in Oswego, all use the Oneida county sand, which is derived from the Silurian rocks—the rocks lying next above the Taconic. The Pittsburgh works use the magnesian sand stone of the lower silurian, obtained from Missouri, a little below St. Louis.

The President—Will Prof. Seely give us the chemstry of glass?

Prof. Seely—As it is getting late, and as there are strangers here prepared to speak, I should like to be excused.

The President—Prof. Dwight, of the Law School of Columbia College, has kindly consented to give us the law in relation to the use of light, which, he says, under the decisions at present in force, is a dark subject.

Prof. Dwight—It may be of some interest to know what are our legal rights in relation to the use of light ; and though, as the President says, the subject on the whole is a very dark one, there are some points which are settled. The only case in which questions could arise in our community is in that of proprietors of adjoining lands. There is one way unquestionably in which a man may acquire a right to have a window look out over his neighbor's land ; that is, by express grant. And the law is settled that such grant, to be valid, must be made by deed—an instrument with a seal. All grants of similar rights in land must be made by a sealed instrument. In case of such grant, the right of the owner of the land must yield to that of the grantee ; so if a person has granted to an adjoining proprietor the right to have a window look out upon his land, he cannot so occupy it by building or otherwise, as to obstruct the enjoyment of this right. Thus far the law is clear ; no doubt can be thrown upon these points. In England it is settled that the right to light coming over the land of an adjoining proprietor may be acquired in two other ways. If a man sells a building with a window looking out on a vacant lot, he cannot afterward build upon the lot in a way to darken the window. This is called a right by implied grant, the other is by right of ancient possession. If a man's window has opened upon his neighbor's land for twenty years, his neighbor cannot then close it. These questions have been raised in this country, and in some of the lower courts there have been decisions adverse to the adoption of the English law. It is thought that it would be peculiarly unsuited to our growing cities and villages. You know that when the common law of England was adopted for this country it was adopted with the proviso that only such portions should be in force as are in accordance with our institutions. Though the questions in regard to the right to light either by implied grant or by prescription, are not yet fully settled, I have little doubt that the English law on the subject will finally be rejected by our courts.

The President—Will Mr. Krafft give us a description of the mode of making soluble glass? He has a manufactory in Brooklyn.

Mr. Krafft arose and whispered to the President, who remarked, "Mr. Krafft is not familiar with the English language, and if the Society will accept my version I will translate for him." Mr. Krafft then spoke in German, Prof. Joy translating as follows Quartz, soda and a little charcoal are pulverized and melted together in a crucible, six fusions being necessary to make a perfect mixture. This is the appearance of the soluble glass. It will dissolve in one-fifth of its weight of water. In this vial is a sample of the solution.

Mr. Dibben—Will the gentleman please state a single use to which the soluble glass has been practically applied?

Mr. Krafft—It is used in some of the calico-print works near Boston as a mordant.

[Our readers are aware that Mr. Krafft's statement of the purpose for which soluble or water glass is used in print works is erroneous. It is not used as a mordant but as a wash.—Eds.]

The President—I can state that it has been successfully used in Germany for fresco painting. I can also state a use for which it has been found not to answer ; that is for cleaning clothes. In a large establishment near Berlin, where there are several hundred children, it was thoroughly tried but was found to dissolve the linen.

Mr. Dibben—Will Mr. Krafft state the price at which it was sold?

Mr. Krafft—The solid at $12 per hundred pounds, the liquid at $10.

The President—I invited some gentlemen here to give a description of the practical mode of making glass, but I do not see them here. Is there any one present who can give us the process? He can use the diagrams on the walls. We should be pleased to hear any remarks.

Prof. Seely.—There is one point that I should like to make here in relation to the chemistry of glass. Any one acquainted with the laws of chemical combination and with the composition of glass would have anticipated that the silicic acid might be replaced by boracic acid ; silicon and boron being so similar in their properties. It is well known that this is found to be the case ; the borates formed by the combination of boracic acid with the alkalis or with metallic oxides are glasses similar in their properties to the silicate glasses, but somewhat different ; for instance, they are more fusible. One metallic oxide may also replace another in the combination. Faraday was the first to suggest that the oxide of zinc might be used in the place of oxide of lead, and a glass is thus produced, superior, I believe, for certain optical purposes to the lead glass. Now, the point that I wish to make is, that this law indicates a wide field which has not been explored. For instance, the metal cadmium is analogous to zinc, and it is probable that a glass in which the oxide of cadmium should replace the oxide of zinc would have properties similar to those of the zinc glass, but still not precisely the same. Let us try it. Rubidia and cæsia too, the newly-discovered alkalis, would, doubtless, make glass with peculiar properties ; and it is conceivable that these properties might be of sufficient value to justify the use of even so rare and costly substances as the oxides of rubidium and cæsium. For instance, if the luster of the glass imitated more closely than any other the luster of the diamond and other precious stones, the cost of the materials would be of trifling importance.

The President announced that the subject for the next meeting is "Salting the Streets," continued from a previous meeting. The association then selected for discussion a fortnight hence, "Naval Warfare," and adjourned.

Hog Packing in Cincinnati.

The Cincinnati *Price Current* furnishes the following statement of the hog packing in that city :—Having obtained a report of the business done at each of the pork-packing establishments we are now able to give the exact number of hogs packed, which is less than we had supposed, for, owing to the large number of hogs which were received by wagon, we did suppose the packers' reports would have overrun the number of our receipts, as we gathered them from week to week during the season. We presume that the increase of wagon hogs was taken by butchers for city use, there being but a light supply of slop-fatted, as compared with other years, so that instead of the packers' report overrunning ours, it does not come up to it by over 10,000 head.

In our paper of the 12th of February we published our last weekly report of receipts, giving the aggregate up to that date, 484,508. The number packed, the average weight and yield of lard per hog, the past and the previous season, compare as follows :—

	No. Packed.	*Av. Weight.*	*Yield of Lard.*
1860–1	433,799	221 5–35	28 9–16
1861–2	473,267	224 23–34	29 5–18

We did not obtain the yield of lard from all the packers, but got the average weight from all but three. The above figures, however, as regards the yield of lard, are probably as accurate as necessary.

The following table shows the number of hogs packed in this city, each season, for the last thirty years :—

Years.	*No.*	*Years.*	*No.*
1833	85,000	1848	475,000
1834	123,000	1849	410,000
1835	162,000	1850	393,000
1836	123,000	1851	334,000
1837	103,000	1852	352,000
1838	182,000	1853	361,000
1839	190,000	1854	421,000
1840	95,000	1855	355,786
1841	160,000	1856	405,396
1842	220,000	1857	344,512
1843	250,000	1858	346,677
1844	240,000	1859	382,826
1845	196,000	1860	434,499
1846	205,000	1861	433,799
1847	250,000	1862	473,267

Since the occupation of the "Sea Islands" by the Union troops, the amount of cotton seed sent to New York is about 1,000,000 pounds. The ginned cotton sent amounts to about 600 bales. A short time since about 30 bales arrived from Fort Donelson, where they had been used to strengthen the rebel defences. Consignments of the confiscated "staple" are shortly expected from the Florida coast.

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Manufacture of Armor Plates.

The manufacture of iron plates for the armor of ships has now become a subject of deep interest, because it is very evident from the experience which we have had with Mississippi iron-plated gunboats, and the *Merrimac* and *Monitor*, that no more war vessels composed entirely of wood will be built for our navy. The Committee on Naval Affairs in the Senate seems to have taken hold of this subject in earnest, as an appropriation has been brought forward to provide a national foundry and machinery for making such plates. Useful practical information in relation to the processes and operations by which such plates are fabricated in other countries is therefore valuable at the present time, and happily this we have obtained in the form of a paper lately read upon the subject by Mr. John Brown, of Sheffield, at the Institution of Mechanical Engineers, Birmingham, England. The following is Mr. Brown's paper, with an engraving, as published in the London *Mechanics' Magazine* :—

MANUFACTURE OF ARMOR PLATES.

Two methods of producing large masses of wrought iron have been in use ; the first by the process of building up under the steam hammer, and the second by building up under the rolls. Under the steam hammer, the plate is produced by welding together lumps or masses of scrap iron, each mass of scrap being added and welded to the end of the plate, until it reaches the required length. Plates made in this way have been seriously objected to on account of their brittleness ; and it is reasonable to suppose that this mode of manufacture is somewhat likely to induce brittleness. There can hardly be any continuity of fiber in a plate forged from masses of scrap iron, perhaps, of different qualities, each at different heats ; the nature of the weld and its form, and the repeated cooling and re-heating of the plate, are also adverse to its possessing great toughness. The rolled plates have been found more uniform in quality and of greater toughness than the hammered ; and though the difficulties in their manufacture are grave, there is no departure from the ordinary practice followed in making large plates for other purposes. The difficulties which do exist are chiefly due to the immense weight and size and the intolerable heat of the mass, which must be dealt with while at a welding temperature.

The general size of the armor plates required for the plated frigates now building in England is from 15 to 18 feet long, from 2 feet 6 inches to 3 feet 10 inches wide, and 4½ inches thick. The weight therefore of the finished plate ranges from 60 to 110 cwts.; and in the unfinished state it comes from the rolls at 80 to 140 cwts. From 3 to 4 inches is cut off the sides, and 10 or 12 from each end ; and in this item of waste the hammering process has an advantage over the rolling.

The mode of manufacture of a five-tun plate is as follows :—Bars of iron are rolled 12 inches broad by 1 inch thick, and are sheared to 30 inches long. Five of these bars are piled and rolled down to a rough slab. Five other bars are rolled down to another rough slab, and these two slabs are then welded and rolled down to a plate of 1¼ inches thick, which is sheared to 4 feet square. Four plates like this are then piled and rolled down to one plate of 8 feet by 4 feet and 2½ inches thick ; and lastly, four of these are piled and rolled to form the final entire plate. There are thus welded up together 160 thicknesses of plate, each of which was originally 1 inch thick, to form when finished 4½ inches, making a reduction of 35 times in thickness ; and in this operation from 3,500 to 4,000 square feet of surface have to be perfectly welded by the process of rolling. It is not surprising that even with the greatest care blisters and imperfect welds should exist and render the plate defective ; this is the chief difficulty to be overcome, and a very serious one it is ; and as the magnitude and weight of the plate increases so does also the liability to failure. The final operation of welding the four plates of 8 feet by 4 feet by 2½ inches is a very critical matter. To bring a pile of four plates of these dimensions up to a perfect welding heat all through the mass, without burning the edges and ends of the plates most exposed to the fire ; to drag this pile out of the furnace, convey it to the rolls, and force it between them, in so short a time as to avoid its losing the welding heat, is a matter of greater difficulty than those unacquainted with the work would imagine. The intensity of the heat thrown off is almost unendurable, and the loss of a few moments in the conveyance of the pile from the furnace to the rolls is fatal to the success of the operation.

A pile of four plates, A, is heated in a special furnace, B, as represented in the engraving, and is drawn out by a liberating chain attached to the roll on to an iron carriage, C, which conveys the pile to the rolls, D. The carriage, C, travels upon a line of rails let into the ground ; and close in front of the roll frame is a small incline upon the railway, which lifts up the front of the carriage at the moment of its arrival at the rolls, and enables it to deliver the pile upon the fore plate. As the plate passes through the rolls it is received on the other side upon a roller frame, F, which is set at a considerable inclination toward the rolls, so that the tendency of the plate is to return. The rolls are then reversed ; and the plate which was pressing against them passes back through, and is received upon the carriage, C ; and again the operation is repeated until the 10 inches thickness is reduced to 4½ inches. The plate is then lifted off the carriage, C, by the crane, G, and deposited upon a massive cast-iron straightening bed, H, and an iron cylinder, I, weighing nine tuns is rolled over it to and fro, being pinched along by hand levers, until the curvature which the plate has acquired in the rolling is entirely removed. As soon as the plate is sufficiently cool, it is lifted off the straightening bed, H, by another crane, and laid upon a planing machine where the final operation of planing its sides and ends is completed.

In answer to questions by the chairman and other members, Mr. Brown replied that two trials of the plates had been made some time previously, to determine their power of resisting shot. But they were not satisfactory to the Admiralty or themselves ; these were however their first attempts in rolling the armor plates, and they did not expect to succeed at once without some failures. He showed specimens of the broken portions of the plates, from which it was seen that the failure arose from the imperfect welding of the four thicknesses composing the armor plate in the final heat.

Two armor plates, however, lately tried at Portsmouth, had proved much more successful. The plates were 4½ inches thick, backed by 18 inches thickness of teak, and were fired at with shot 68 lbs. weight from a 95 cwt. smooth 8-inch bore gun, with 16 lbs. of powder, at 200 yards' range. The first plate was 7 feet 9 inches long by 3 feet 2 inches wide ; the first shot hit near a corner of the plate, where the weld was imperfect, and indented the iron to some depth ; the second shot also hit near the same place and indented the plate ; the third shot struck the plate in the center and made a hole right through the iron, making a crack all round the opening ; the fourth shot hit near the bottom and broke the lower edge of the plate in ; and the fifth shot happened to go through the hole made by the third. The second plate, was nearly double the length of the first, being 14 feet long by 3 feet 7 inches wide ; the first shot indented the plate 3 inches and broke out the iron at the center of the indentation ; the second shot punched right through and broke the backing, and the third and fourth shots each broke out a hole of 12 inches diameter and smashed the backing. A portion broken off one of the plates was exhibited, which showed that the iron was much more fibrous than in the plates made in the first attempts ; and he expected still more favorable results would be obtained if the iron could be kept in a thoroughly fibrous state, so as to have a soft and tough quality, which was less easy to fracture than a hard and brittle metal.

Two of the armor plates were now in the hands of the Admiralty for further experiments ; and trials had just been made at Shoeburyness of two of the plates 5 inches thick, which had proved altogether most satisfactory as to the tenacity and toughness of the plates. The object was to produce armor plates capable of resisting guns of increased power, and the experiments now made seemed to show that this might be effectually accomplished by the mode of manufacture that had been described.

Fig. 1

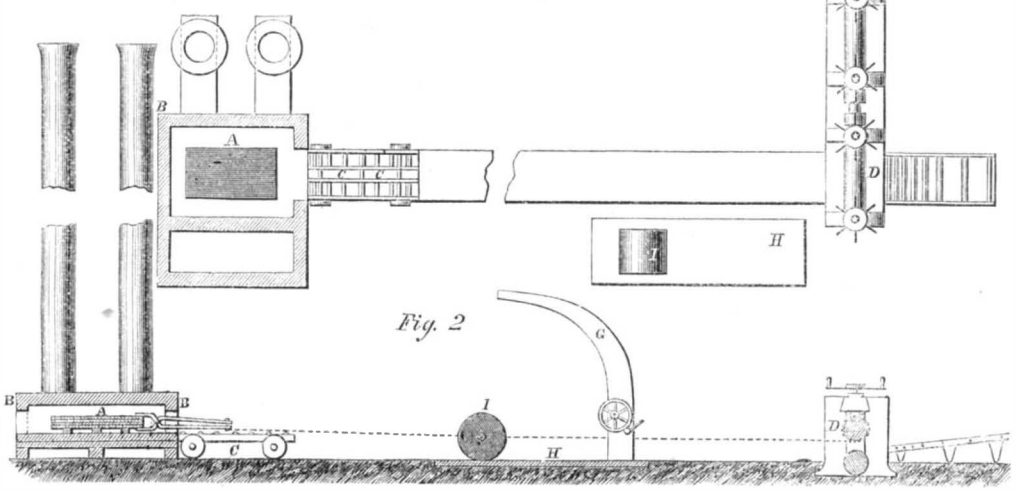

Fig. 2

Preserving Timber.

A successful experiment has lately been made in the harbor, of Cherbourg, France, by order of the Minister of Marine, for the purpose of testing a discovery of M. de Lapparant, naval constructor, in preparing wood for vessels to prevent it from being affected with dry rot. The invention consists in subjecting the timber to a slight carbonization with inflammable gas. The timber tested was prepared in an apartment fitted up for the purpose, and common coal gas was used. It was under the complete control of the operators, and the extra expense was only about ten cents per square yard of framing and planking. The timber thus treated, it is said, will not be affected with dry rot.

Chevreul on St. Victor's Photographic Discoveries.

With reference to M. Niepce de Saint Victor's last researches in Heliochromy, M. Chevreul has taken occasion to call the attention of the Paris Academy to two important facts ; the first is that the image produced by the sun is direct and not reversed, like all the images produced by other processes ; second, that the light whitens the part it falls upon by a peculiar action of the dextrine varnish containing chloride of lead, while without this varnish it turns the chloride of silver of the daguerrean plate violet, giving a very remarkable result, as M. Niepce has observed that the black lines of an engraving are reproduced in black on plates prepared with his varnish. The colors of the model are not all produced concurrently ; for example, yellow makes its appearance before green, and by the time the latter has come out the yellow is enfeebled, if not effaced. Does it not then follow, he asks, that a means of faithfully reproducing the colors of the model consists in having screens cut out in certain portions, with which to cover those parts of the model where the colors that manifest themselves the soonest exist, so as to give to the colors which require longer to manifest themselves, the time they require ? It seems very desirable, he adds, that a skillful and experienced chemist should endeavor to recognize the molecular actions which sensitive materials undergo in ordinary photography and in heliochromy.

Two rails, weighing respectively one tun each, were rolled at the Codnor Park Iron Works, England, on February 15 ; one to a length of 120 feet, and the other 110 feet.

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Correspondence

Lead for Cannon Balls.

Messrs. Editors :—In almost every number of the Scientific American I see some description or illustration of new and improved projectiles for both rifled and smooth-bore cannon. And there is one thing which, as far as I am acquainted with the subject, appears to have escaped the notice of all those who are laboring toward the perfecting of this sort of missile. Judging from all the information that I have been able to obtain on the subject, it would appear that iron, either wrought or cast, is the only metal that has been used as a projectile for heavy ordnance. The idea has occurred to me, however, that if lead is the most suitable material to use as a projectile for small firearms, why is it not also as well adapted to those of a larger sort? I am of opinion that it is. I am aware that it will be objected to as being too soft for this purpose, and that it would have but slight effect on the iron-clad ships which are destined, ere long, to cause a great revolution in the mode of naval warfare, and cause, in the course of a few years, the old wooden navies of the world to be known only as things that were but are no more.

I say that I am of opinion that lead is not only the best, but the only substance which is in reality adapted for projectiles, to be fired from cannon, either smooth bore or rifled, but more especially the latter. In the first place, by using the leaden ball there is a gain of nearly two-fifths in the weight of the metal on balls of the same size. For instance, an 11-inch spherical shot or ball weighs about 181 lbs., while a leaden ball of the same size weighs about 285 lbs., which, I should think, ought to make a vast difference in its effect when striking an object. My next reason is, that I believe it to be the best adapted for rifled guns, from the fact that it is the only metal which can readily be made to conform itself to the grooves of rifled guns, and at the same time not destroy or wear away the edges of the grooves, and render the guns, as far as rifling is concerned, useless; and I think that its greater specific gravity ought also to give an increase of range over the iron shot of the same size, for the same reason that you can throw a musket ball to a greater distance than you could a marble of the same size. Neither do I think that its softness can be urged as an objection to its use. I will also give my reasons for this opinion, which is founded on actual experiment, but as I had neither the means nor opportunity of conducting them on a large scale they were necessarily rather limited. But here is the result. I fired a number of shots, at a distance of 200 yards, with a common rifle, carrying about 74 spherical balls to the pound, but those which I used were conical, and run about 47 to the pound. The balls invariably went through an inch whitewood board and through a piece of cast iron one-fourth of an inch in thickness, placed a few inches from the board, for the purpose of stopping the balls. I next stuck a common chopping ax in a tree, at a distance of about twenty yards, and fired at the solid iron part of the ax, about midway between the eye and the steel, the ball making an indentation of rather more than one eighth of an inch, or about one-third of its own diameter, which is more than any of the shot fired from the *Merrimac* were able to do on the iron-clad sides of the *Monitor*. The charge of powder used was, in every instance, two drams. It may be said that lead is too expensive. I admit that it is expensive, but not so much so as the wrought-iron shot used by the *Monitor*, said to cost $47 each, while a lead ball of the same size, and weighing 104 pounds more would not cost, at the most, over $35. I have now given my opinions and reasons for them, in an imperfect manner, it is true, and should be very happy to hear both your and other's opinion on the subject.

J. D.

Chatham, C. W., March, 1862.

Magnetic Torpedoes.

Messrs. Editors :—Permit a reader of your valuable and patriotic journal to suggest the practicability of making floating torpedoes for river and harbor defense with an outside covering of magnetized iron. The obvious advantage attending such a construction is this: attracted by the armament, machinery, or iron mail of the enemy's vessel, the torpedo will strike forcibly against the hull or sides thereof; such concussion will be sufficient to operate a simple contrivance of springs, so as to cause the torpedo to explode. The instrument of destruction thus described may be anchored as a buoy in a channel.

Francis J. Collier.

Philadelphia, March 25, 1862.

The Nova Scotia Gold Fields.

Messrs. Editors :—I again take the liberty of addressing you, as I know from your paper all science is by you fostered and encouraged. Now, what I wish to bring to your notice is the fact that our gold fields are a great fact. We can procure millions upon millions of tuns of quartz out of which, while digging from the earth, or from boulders upon the surface, we can pick out small pieces of pure gold from a grain to an ounce. Believing that all such quartz contains more or less gold, not visible to the naked eye, but which may be extracted by a better process than has been for many years in use, I wish to call your attention to the fact that, through your paper and people, scientific men may perhaps give it their more serious attention, as, if they do, fortunes immense must be made out of it. For my own part, I hear or read of no process that seems to me so feasible as that of Professor Hardinge, of New York, but I cannot hear or find out any more about it than what I got out of your paper. I have also heard of another process by J. A. Bertholde, spoken of some time since in the New York *Tribune*, and as tested by a Judge Chambers in San Francisco. But whether either of these machines have since found general favor with the public, I cannot learn.

Now, it appears to me you will not only do the people of New York, but your own scientific people and machinists a good turn, by calling their attention to the matter in such a way as you may deem best. I am not able to advise, neither do I wish to be troublesome, but would merely state the fact of our gold fields being a great truth, but for the want of some good means to extract the gold they are not of so much value to the world as they ought to be. Experiment has shown that we have any quantity that will yield from $9 to $1,000 per tun in our rude way. Of course, the large quantity is exceptional, the small the more general rule as it now appears. I see your paper as published, and any remarks therein will be all the answer necessary.

John D. Nash.

Halifax, N. S., March 19, 1861.

Answer to "Questions for Millers."

Messrs. Editors :—In your valuable paper of March 22d, under the heading of "Questions for Millers," the writer says he would like to have the views of millers in regard to dressing stone and bolting flour. I should recommend for a burr stone of 3 feet 10 inches a draft of 21 sections, 2 furrows in a section. Where the velocity is 135 revolutions a minute, I would have 4 inches draft, the furrows to be 1¼ inches wide and $\frac{3}{16}$ of an inch deep at the back, with a true taper from the bottom up to the face of the stone. A bolt 16 feet in diameter, covered with No. 9 and 10 cloth, will not bolt more than 3 or 4 bushels an hour and do it clean. I do not consider a circular furrow fit for a flouring stone, for these reasons: that it makes quite too much middlings, and needs altogether too much dressing on the face of the stone to keep it in order, on account of the meal or flour discharging from between the stones too quick. I think a flouring stone should be faced at the eye just enough to take off the rind, which is distributed by the staff, the face to have from 20 to 26 cracks to the inch for grinding grists, and 30 to 35 for merchant work.

N. H. E.

Owego, N. Y., March, 1862.

Aiming Guns by Means of Mirrors.

Messrs. Editors :—In the debate on the Stevens Battery in the Senate last week, Mr. Clark objected strongly to the construction of the vessel, because, as he alledged, one man to each gun would be exposed to the enemy's fire, as a gunner must remain on deck to sight the gun. This point was admitted, by even the friends of this battery, to be one of too much importance to to be overlooked.

Though unable myself to see any great force in the Senator's objection, when applied to a vessel carrying the heaviest guns in the world, and with a speed that will enable her to choose her own position in any engagement, yet I want to make this suggestion :—

If naval warfare is hereafter to be conducted without risk of life, we want an arrangement for sighting the guns by means of a mirror on the breech, arranged so that it may be seen below the deck. By this means a gun may be directed with the same certainty without exposing the gunner. Some invention is required to arrange the details, and to this point I would invite the attention of inventors. The use of mirrors to conduct the pilot's vision from a safe position below the deck would enable him to hold the wheel with a more steady nerve in a close engagement; and the same means could be used in taking observations through a port hole. This would scarcely require an invention, a mirror held in the hand would answer.

E. S. Wicklin.

Washington, D. C., March 31, 1861.

New Use for Graves.

When our troops dismantled the rebel batteries at Cockpit and Shipping Points, on the Potomac, the soldiers of the Massachusetts First came across numbers of graves. They were laid out, says a correspondent of the Boston *Traveler*, in the streets, carefully labeled, and contained pathetic remonstrances against disturbing the repose of the dead, and violating the sanctity of the tomb, so that suspicions were engendered that the sacred dead might be brought to life again, and made to see a little more service under the sun. Spades and shovels were accordingly brought into requisition, and speedily were exhumed not the bodies of departed Confederates, but numbers of nice, new tents, packages of clothing, mess chests furnished with all the appliances of modern cookery, trunks of various articles, tools, &c. The grave-diggers were complimented for the success of their first sacrilegious experiment and recommended to try again.

Hint to Housekeepers.—Every housekeeper who uses kerosene or well oil, knows that it affords the best and cheapest light of all illuminating oils; but she also knows that the constant expense and annoyance from the breakage of lamp chimneys almost, if not quite, counterbalances the advantages of its use. One who has thoroughly tried the experiment of preventing chimneys from cracking with the heat of the flame, says :—Put the glass chimney in lukewarm water, heat to the boiling point, and boil one hour, after which leave it in the water till it cools. The suggestion is worth a trial.

Immense Projectiles.—Eight solid cast-iron balls were lately sent from Pittsburgh for the great 15-inch Rodman gun at Fortress Monroe. It had been intended to use shells chiefly in this gun, to avoid undue strain upon it, but the solid shot are furnished to crush in the sides of the *Merrimac* should she attempt to pass out into the Chesapeake. Such shot, at 200 yards range, would crush through the sides of the strongest iron-clad frigate yet built.

In the Tulare lakes of California there are great numbers of white swans. They weigh about 30 lbs. each, are excellent eating and very fat, and much sought after by the hunters. They feed partly on the fresh water mussel or clam which is found in extraordinary abundance in all the Tulare waters, completely paving the bottom and very dangerous to walk on, as they are thin and brittle and will cut like glass.

The Philadelphia *Ledger* states that there is an iron submarine boat in that city, shaped like Winan's cigar steamer, which is intended to operate against the *Merrimac* under water. It is capable of being moved under water, and remaining without communication with the atmosphere for about six hours.

Crude Petroleum is now selling for 50 cents per barrel at Oil Creek, Pennsylvania. About 15,000 barrels are now ready to come down the creek with flat boats.

A body projected vertically upward in the atmosphere falls less rapidly than it rises.

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CHEMICAL AND PHYSICAL MODIFICATIONS OF THE ATMOSPHERE CONSEQUENT ON HABITATION.

The following are some extracts on this important subject from the *British and Foreign Medical Review*. They deserve to be attentively read by every person as they concern man in all countries and in most conditions of life, but especially those who reside in cities, and large manufacturing villages :—

The repeated observations of chemists have taught us to regard the identity of composition of the atmosphere as a fixed law—one to which no exception is to be found in nature, unless it be in the neighborhood of tropical rivers, where vast quantities of organic matter, the *débris* of a luxuriant vegitation, are rapidly passing into decomposition. Everywhere, whether collected on the top of Mont Blanc, or on the banks of the Seine or Thames, or in the middle of the Atlantic, the two main constituents of the atmosphere are found in precisely the same proportion, and the more perfect the processes of analysis have become, the firmer has the constancy of this relation been established. This fact has always, however, been rebelled against by the common experience of mankind; it has been almost an opprobrium to science that, in spite of the manifestly different feeling of the air on the Swiss mountain, and in the middle of London, the chemist can detect no difference in composition. During the last few years several chemists have directed their attention to this apparent inconsistency between the organoleptic and physical characters of the air with special reference to the condition of the atmosphere in towns. These researches have related mainly to the quantity of carbonic acid, and other products of combustion, and to the existence of organic matter in suspension. Among the most important are those of Dr. Dundas Thomson and Dr. Angus Smith.

The percentage of carbonic acid usually existing in the air of London was found by Dr. Roscoe, to be 0·037 per volume, a result not differing materially from those obtained by Dumas and Boussingault in Paris. The analyses on which these are based were made by passing a known volume of air over weighed tubes containing alternately pumicestone steeped in sulphuric acid and potash, a method which leaves nothing to be desired in respect of accuracy. Dr. Smith's estimates of the carbonic acid of the air of Manchester, made by the same method, gives somewhat higher results.

A much more important product of combustion is derived from the oxidation of the sulphur contained in coal, and the introduction thereby into the atmosphere of sulphurous and sulphuric acids. In the researches undertaken by Dr. Thomson during the last epidemic of cholera, which consisted in passing large quantities of the air of London through distilled water, it was found that such air invariably possessed an acid reaction, and that this reaction was due to sulphuric acid. Dr. Smith has further investigated this question, and has found that in Manchester the acid reaction of the atmosphere is much more constant and intense than in London. The actual quantity, however, is exceedingly small; of a solution containing a thousandth part of its weight of carbonate of soda, quantities varying from ten to fifty grains suffice to neutralize 1,000 grains of Manchester rain; and as much cistern-water is found to be neutralized by twenty-five grains; from which results Dr. Smith concludes that the largest quantity of sulphur acids existing in the atmosphere of the town does not exceed 0·004 per cent by weight, a proportion amounting to not more than a twentieth part of that of the carbonic acid.

Dr. Dundas Thomson appears to have been among the first to recognize the importance of organic matter as a constituent of the air of towns, and to express the conviction that the gaseous products evolved during putrefaction are not the main sources of danger. Proceeding on this idea, he subjected a large quantity of atmospheric air to chemical investigation, "with a view of condensing any vapor, or detaining solid particles, which might be disseminated." The result was entirely negative. Further inquiries of the same kind were made, under the sanction of the Board of Health, in 1854, the air being passed, as has already been mentioned, through distilled water, the result invariably being that hyphaceous fungi made their appearance in the water, and in a short time, by their rapid growth, pervaded the whole of it, so as to be evident to the unassisted eye. It was also found, that on passing the air through sulphuric acid in the same manner, the acid soon became dark colored, in consequence of the charring of the organic matter introduced into it. Dr. A. Smith has worked out the idea much more completely. He has preferred a chemical to a microscopical test for the detection of the suspended organic matter. It consists in passing the air through a very dilute solution of permanganate of potash, the strength of which is determined by ascertaining how much is required to decompose a solution of a weighed quantity of oxalic acid, or of uncrystallizable sugar. Many of Dr. Smith's results are of such a nature as to be beyond the possible limits of this source of error. It was found that the same quantity of the solution of permanganate which was decolorized by one bottle of air obtained in a close court in Manchester, required twenty-two bottles to decolorize it on the hills in the neighborhood.

It is not difficult to satisfy ourselves that animal matter in putrefaction does disengage from its surface portions of its substance, of sufficient tenuity to be suspended in the atmosphere. Without referring to offensive smells, which of course must be material, we have several satisfactory proofs. If a bell-glass be inverted over decomposing animal matter in a moist condition, the inner surface of the glass becomes in a few days bedewed with moisture, which on being examined under the microscope is found to contain the same filamentous fungi to which reference has already been made; and on evaporation it leaves a residue, which is blackened by incineration. Similarly we find that the moisture which is deposited in glutinous drops on the sides and arched roofs of sewers, is rich in organic matter, which must clearly have been derived from the air of the sewer. Dr. Smith has related the results of experiments showing that air kept for a length of time in contact with putrescent matter, becomes loaded with oxidizable material, and acquires the power of decomposing a correspondingly large quantity of permanganate of potash.

Another group of facts shows us that the existence of putrescent impurity in the air is a principal, though not a necessary, condition of the induction of putrefaction in bodies susceptible of the change. Thus, for example, I have found that milk which retained its freshness for hours, will at once turn on being exposed to a putrid emanation. Butchers are familiar with the fact, that meat cannot be successfully dressed in the neighborhood of a stinking gully-grate, or of a stable reeking with ammonia; and for the same reason, every intelligent butcher keeps his slaughter-house in a state of scrupulous cleanliness. It is not, however, to be forgotten that other causes, possibly electrical, the nature of which is still involved in obscurity, have a still greater influence in inducing putrefaction. Thus, the butcher finds that on one day he is able to slaughter and dress even veal or lamb with safety; whereas on another, not differing in temperature, incipient putrefaction may render the carcass unsalable, in spite of the most careful precautions; butchers are apt to believe that this occurs mostly on calm days when the air feels heavy. Still more remarkable are the facts recorded respecting the slaughtering of cattle in hot countries; the operation can only be safely performed when the air is clear, and the sky cloudless. Under such circumstances, we are told that the appearance on the distant horizon of a cloud "like a man's hand," the sure precursor of a storm, is a sign to the slaughterers on the Pampas of South America to desist from their work, for it is immediately followed by rapid putrefaction.

Air contaminated with putrescent matter is for the most part alkaline. Thus the air of sewers is invariably so, as has been proved by the experiments of Dr. Dundas Thomson, its alkalinity being owing partly to ammonia, partly to the sulphuret of ammonium, the form assumed by the sulphur disengaged in the composition of fecal matter. The air of stables and stable dwellings is strongly alkaline, and the air expired by men and animals, although at first probably acid, becomes alkaline by putrefaction. The relation between putrefaction and the existence of ammonia in the air is therefore so close, that the detection of this body may, under ordinary circumstances, be regarded as a proof of its existence.

In the preceding paragraphs we have reviewed all the differences which are discoverable, either by physical or chemical means, between the atmosphere of towns and that of the country; and we are in a better position to determine, in the light of physiology, which of these conditions is likely to exercise most influence on the health of man. As regards the existence of an excess of carbonic acid, it is clearly of no importance whatever; for in many large towns no such excess is met with. Sulphurous and sulphuric acid, if they have any influence, must act as "colytics", *i. e.*, as agents tending to arrest putrefactive change. The absence of sunlight, on which the more equable temperature of towns depends, has unquestionably an unfavorable influence, but one which is very limited. We are driven then to the only difference which remains, viz., that which depends on the existence of oxidizable matter, as indicated by its power of reducing certain metallic oxides.

General News about War Engines.

Steel Projectiles.—We learn from the Pittsburgh *Evening Chronicle* that experiments are now in progress in that city for the purpose of determining whether steel may not be successfully used in the manufacture of projectiles for our great guns. The *Chronicle* says :—"A short time since a number of steel balls, twenty-four pounders, of the elongated pattern, were made at the works of Robinson & Minis, over the river, and last week they were removed to the proving ground, up the Allegheny, and experiments made of their effect on heavy iron plates as compared with the usual cast iron balls. The trial, though not as satisfactory as it might have been, was yet sufficient to show the vast superiority of the steel projectiles. The steel balls penetrated nearly through the massive iron target, tearing and shattering it at every discharge, while the cast-iron balls broke in fragments on striking, and scarcely made an indentation on the plate. A gentleman who has taken much interest in the matter informs us that the steel balls were scarcely injured by the concussion, a small portion of the point only giving way. He feels satisfied that steel projectiles are immensely superior to iron, and expresses his belief that, when used with guns of a proper caliber, that there is no plating now made they will not penetrate."

A Cavalry Cannon.—The San Francisco *Bulletin* states that James M. Rosse, of that city, has exhibited a cavalry cannon. The weapon is 15 inches in length, and of such a size as will insure a greater or less "flare," so as to scatter the charge of 100 or more bullets which it is designed to vomit forth upon an enemy. The cannon is mounted in a strong case, which is pivoted upon the saddle-tree. It is loaded at the breech. The inventor proposes that every fifth horse in a cavalry squadron shall be mounted with one of these little cannon, which only weigh 30 pounds each. During a charge upon infantry he would have the cannon cavalry spur forward a few paces, deliver their fire and reload, while the four-fifths of the squadron spur on to take advantage of the murderous preliminary fire. Then, if they be repulsed, the cannon cavalry will be ready to cover their retreat or assist them in a second onset.

Projectiles and Armor-Clad Vessels.—Assistant-Secretary Fox, of the Navy, has obtained quite a collection of relics, which afford practical hints upon gunnery and iron-clad ships. Among them are specimens of plates from the armor of Commodore Foote's gunboats, which were damaged in the attack upon Fort Donelson. One of the plates, three-quarters of an inch thick, was struck, apparently at an angle of forty-five degrees, and the ball glanced off, making an indentation corresponding to one-third the thickness of the ball, and about fifteen inches long. The plate was partially fractured, but the iron was tough enough to ward off the missile. The most interesting object in the collection is a portion of the shell fired from the *Merrimac* at the tower of the *Monitor*. The head of the shell was embedded in the iron armor of the *Monitor*, the remainder having been scattered by the explosion. Secretary Fox says it is useless to make more guns of the caliber now used, but that fifteen-inch Columbiads, which will smash through anything that floats, must be provided for naval warfare.

Carpenter, on the microscope, contains a very full treatise on optics, so far as the science relates to the microscope. The work is for sale by C. S. Francis & Co., of this city.

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Improved Water Wheel.

The accompanying engraving represents a vertical section of a water wheel of novel construction, invented and manufactured by one of the oldest millwrights in the State of New York. It is the invention of Henry Van Dewater, who claims it to be superior to all other wheels in use.

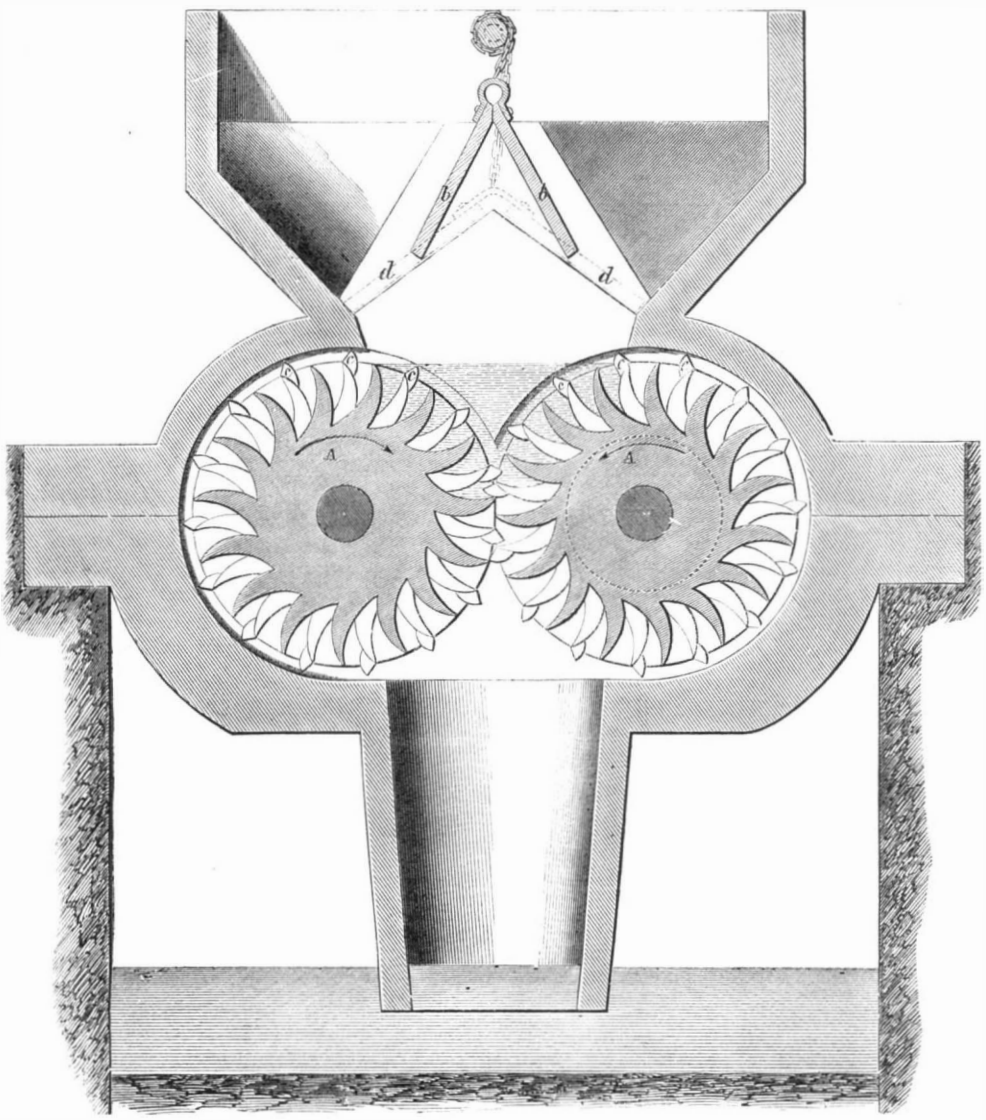
The construction is as follows:—Two wheels, A A, are hung upon horizontal axes in such a manner that the floats may interlock at their outer ends, as shown. The floats are curved in a way to receive the water upon their concave sides, and each wheel has two sets of floats extending from the disk or head inward to the middle of the wheel, each float of one set occupying a position intermediate between two floats of the other set. Small wedge-shaped blocks, *c c*, say an inch and a half wide and of the same thickness, are secured upon the floats at their edges next the disks. As the cut is a sectional view the blocks on one set of buckets only are shown.

The buckets are hung in a draft box, the upper end of which receives the water at the level of the water in the flume, while the lower end enters the raceway.

The gate is formed of two plane boards or plates, *b b*, connected at their upper edges by a piece of leather or other flexible material, and resting at their ends upon strips, *d d*, secured to the sides of the draft box. It will be seen that when the gate is lowered so as to rest fairly upon the strips, *d*, the lower edges of the plates, *b*, will come in contact with the sides of the draft box and close it against the flow of the water, while by raising the gate two equal openings are made, one on each side, through which the water flows upon the wheels. The size of the openings is adjusted to yield the quantity of water desired by raising the gate to the proper hight.

The inventor claims that this wheel, besides using the water to greater advantage and yielding a better result than any other wheel, may be easily connected with the machinery by means of a drum upon the wheel shaft, and that it has numerous other advantages which he will describe at great length to any one who will address him on the subject.

The patent for this invention was granted through the Scientific American Patent Agency, September 3, 1861, and further information in relation to it may be obtained by addressing the inventor, Henry Van Dewater, at Auburn, N. Y., or C. Hastings at Millbury, Mass.

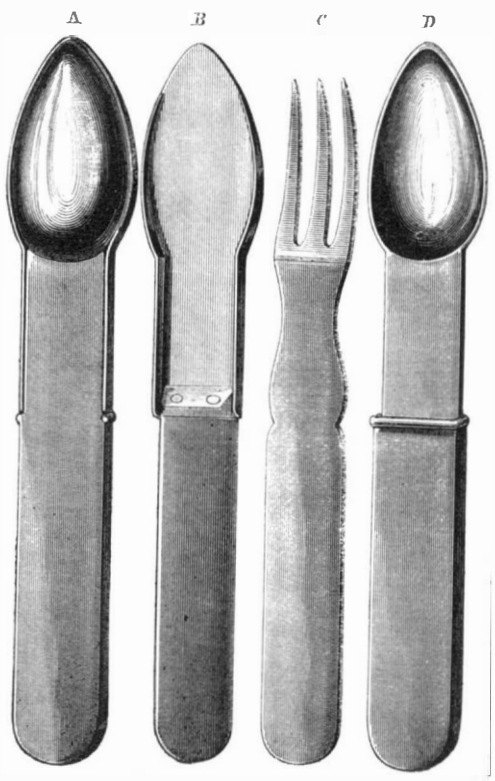


VAN DEWATER'S WATER WHEEL.

Lake Superior Copper Mines.

The *Annual Review* for 1861, speaking of the Lake Superior mines, states that ingot copper underwent extraordinary fluctuations in prices last year. In the month of July the price was seventeen cents per pound, to-day holders refuse twenty-seven cents cash. The ordinary annual consumption of copper in the United States amounts to 12,000 tuns. In 1860 Lake Superior produced 6,000 tuns, and the rest was obtained from Canada, Tennessee and Chili. At the opening of lake navigation in 1861 the prices of American copper were very low, and considerable quantities were then shipped to Europe. For finer manufactures, it is preferred in Paris and Germany, on account of its great ductility. In the month of December last the prices of copper had advanced so much that American copper was actually reshipped from Havre to New York. Since the rise of the tariff in August last, the importation of copper has gradually declined. As the demand for this metal by the Federal government for the manufacture of articles for the army and navy has been large, and will be so for some time to come, this year will be a very prosperous one for our copper miners. The shipments of copper from the Lake-Superior regions in 1861 amounted to 7,400 tuns; the average price was $420 per tun.

NEILL'S COMBINED KNIFE, FORK AND SPOON FOR THE ARMY.



The accompanying engraving represents a combined knife, fork and spoon, designed especially for the use of soldiers. The articles are so fashioned and constructed that they readily slide together in the compact and protected form represented at A, the three articles when separate being shown, the knife at B, the fork at C, and the spoon at D. The handle of the spoon is made double, forming a metallic sheath into which the handle of the fork and the blade of the knife are inserted; the handle of the knife being of such shape as to form a complete cover to the bowl of the spoon. No springs, clasps or buttons are required to hold the articles together, and when combined the three form a compact package, exposing no points or edges, and occupying no more space than a good-sized jack knife.

The patent for this neat invention was granted January 4, 1862, and further information in relation to it may be obtained by addressing the inventor, Arthur Neill, at 100 Church street, Boston.

British Iron Tower Ship.

We learn from our foreign exchanges that experimental firing has recently been conducted at Portsmouth with Captain Coles's cupola vessel, having two 100-pounders placed in a tower and firing at a target. The two 100-pounders were fired singly and together, and in quick firing six rounds were fired in as many minutes. The concussion from the discharge of the guns was but trifling, and was, in fact, found to be greater outside the shield than within it. The smoke cleared off as effectually and the guns, with their carriages, worked with the greatest facility. The shield ship which it is proposed to build on this plan will have no masts, and when afloat will show to the view above her deck merely her funnel and the tops of her shields. Cleared for action, the ship's bulwarks are thrown down all round her, level with the upper deck, along the center of which are ranged her cupola shields, resembling gigantic inverted teasaucers, each containing two 100-pounder Armstrongs of 88 cwt. These shields rest upon towers, which are sunk through the upper deck, and are fixed on a turntable on the deck below, which revolves with the guns, shields and men, as may be required. The hight of the shield from the upper deck will be about five feet, which will be but a small object for an enemy to fire at; shot can only strike it at an angle of 45°. The muzzle of the guns will be 9 feet 6 inches from the water. The sides of the vessel will be covered with armor plating. The shield ship will be 2,500 tuns measurement, and her estimated cost is, as far as can be ascertained at present, $900,000. Her draught of water is to be 20 feet, and her speed 12½ knots.

MAINE MANUFACTURING NEWS.—The Maine Legislature, at its late session, passed special acts to incorporate the Capoon Manufacturing Company, Bowdoinham Mill Company, Knox Manufacturing Company, Boot and Shoe Tip Mill Co., Weskeag Manufacturing Company, Harraseeket Tide Mill Company and the Plumer Patent Last Boot and Shoe Company. Near the close of its session it also passed a general law, authorizing the formation of joint stock companies for manufacturing, mechanical and other purposes, without a special act of the Legislature. It is hoped that this act will have a very beneficial effect.

IN compliance with the joint resolution of Congress, operations have been commenced on the United States sloop-of-war *Roanoke* at Brooklyn, to razee her and convert her into an iron-clad battery.

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NEW YORK, SATURDAY, APRIL 12, 1862.

WHAT CAN BE DONE FOR INVENTORS.—ADVICE GRATIS AND ADVICE FOR PAY.

For the information of our new subscribers, we would state that it is the custom, at the office of this paper, to examine models or drawings and descriptions of alleged new inventions, and to give written or verbal advice as to their patentability, without charge. Persons having made what they consider improvements in any branch of machinery, and contemplate securing the same by Letters Patent, are advised to send a sketch or model of it to this office. An examination will be made and an answer returned by early mail. Through our Branch Office, located directly opposite the Patent Office in Washington, we are enabled to make special examinations into the novelty and patentability of inventions. By having the records of the Patent Office to search, and the models and drawings deposited therein to examine, we are enabled to give an inventor most reliable advice as to the probabilities of his obtaining a patent, and also as to the extent of the claim that it is expedient to set up when the papers for an application are prepared. For this special examination at the Patent Office we make a charge of Five Dollars. It is necessary that a model or drawing and a description of the invention should accompany the remittance.

The publishers of this paper have been engaged in procuring patents for the past sixteen years, during which time they have acted as Attorneys for more than FIFTEEN THOUSAND patentees. Nearly all the patents taken by American citizens in FOREIGN countries are procured through the agency of this office.

Pamphlets of instructions as to the best mode of obtaining patents in this and all foreign countries are furnished free on application.

For further particulars as to what can be done for inventors at this office, see advertisement on another page, or address MUNN & Co.,

No. 37 Park-row, New York.

THE PROPOSED TAX ON PATENTED ARTICLES

We have received a pamphlet, recently published by H. Howson, of Philadelphia, which contains comments on the following inquiry, "Is it a prudent measure to impose a heavier tax on patented than unpatented articles?" This interrogation is answered in the negative, and the author gives his reasons why such a tax should not be imposed. This pamphlet has been called out by the following clause in the National Tax Bill :—"*Provided*, That all articles manufactured as aforesaid, and not otherwise provided for or charged with duty in this act, which are entitled to the privileges and immunities of patents under the laws of the United States, shall pay and be subject in lieu of 3 per cent *ad valorem*, as aforesaid, to a duty of 5 per cent *ad valorem*."

The principal objection that we can urge against taxing patented articles is the tendency which it may have to prevent the adoption of many improvements in manufacturing operations, and thus not only defeat the objects contemplated by the law, but work positive injury to the progressive industry and inventive talent of our country. The discriminating tax upon patented articles appears to be unwise, and we trust that this subject will receive the calm and careful consideration of Congress.

We have hitherto refrained from discussing the tax bill, although many of its features come within our legitimate province for comment. One reason for this is, that we have really become disgusted with the efforts made by vast numbers of merchants, manufacturers and others to get the goods and articles connected with their business exempt from the tax bill. It is well known that the expenses of this dreadful civil war are very great, and must be paid by the people. Every citizen should be willing to share the burden of this tax. All true patriots are willing to suffer for the welfare of the country in its hour of peril. As a people we have but little experience in heavy direct taxation, such as that which prevails in the empires and kingdoms of the old world, and our legislators may make mistakes, but we must be taxed heavily for several years to come, and the great question is, "How shall the taxes be imposed with the least injury to the greatest number?" It has been the ruling policy in England for the past twenty years to lay direct taxes upon as few articles as possible, and thus obviate the employment of a large number of tax collectors, because a horde of such characters swallow up a great portion of the taxes, and they exert a demoralizing influence upon the community.

Mr. Howson states that the tax upon patented articles will operate very injuriously upon those who have patents for designs, but he relates that the stove manufacturers of Albany and Troy have come to a resolution as to a mode of obviating the payment of this tax should the above clause in the tax bill pass. Their design-patents are obtained for the purpose of protecting their patterns, not the stoves; therefore he says, "They will abandon their patents, and erase the word patent from their stoves." By doing this they will save $40,000 per annum and be able to compete on equal terms with those manufacturers who have not patents. The question is certainly an intricate one, but we can see no good reasons why the manufacturer of patent goods should be charged two per cent more taxes than the manufacturer who makes unpatented goods with patented machinery.

Manufacturers and patentees throughout the country who feel an interest in the subject ought to loose no time in communicating their views to their members of Congress.

A NEW LEAF TURNED OVER IN THE POLYTECHNIC ASSOCIATION.

The Polytechnic Association of the American Institute, at its recent choice of officers, elected for President Charles A. Joy, Professor of Chemistry in Columbia College. Professor Joy, after graduating at Union College, at Schenectady, in this State, in 1845, went to Germany and devoted several years to the study of chemistry under the most renowned teachers in that country, and he now occupies the highest position of any chemist in the United States. He has entered with remarkable zeal into the proceedings of the Polytechnic Association, and displays extraordinary sagacity in the measures which he has adopted to make the discussions instructive and interesting. When a subject is selected for discussion for a future evening he sends invitations to persons who have made its several departments a specialty; and thus makes sure that each branch shall be treated in an intelligent and competent manner; while his own varied learning is generally able to supply the place of any one who may fail to respond to the invitation. In the evening of March 27th the subject of glass was that chosen for examination, and the President had invited one person to give a history of the art, a second an account of its chemistry, a third the geological position of its materials, a fourth the mechanical manipulations of its manufacture, and a fifth the legal rights in relation to its use. The manner in which the several branches of the subject were treated will be seen from our report on another page.

We shall watch the proceedings of this society under its new management, and in publishing any portion of them shall adhere to the same rules which have governed us heretofore. Whenever anything is said that appears to be of interest to any considerable number of our readers it will be reported, and all other matter will be rigidly excluded.

THE REASON WHY THE ARTILLERY WAS NOT IN THE BATTLE OF NEWBERN—IMPROVEMENT IN SIGNALS SUGGESTED.

After the battle of Roanoke Island, General Burnside requested the Governor of Massachusetts to send four surgeons to take the place of four connected with the Massachusetts troops who had been disabled, one having been wounded and three others having become exhausted, one of whom died from overwork. The request was promptly complied with by the Governor, and one of the four surgeons selected was Dr. J. B. Upham, of Boston. It so chanced that the doctors reached General Burnside's expedition just as it was on the way to Newbern, and they were retained on board the flag ship, as their services might be needed in the anticipated battle.

Dr. Upham, having at former times taken much interest in telegraphing, at once turned his attention to the system of signals employed to direct the movements of the vessels. It is well known that marine signals are made by means of flags and lights of various colors, and it at once occurred to Dr. Upham that while these are admirable in clear days and nights, they are useless in thick and foggy weather. In thinking of the subject, the idea suggested itself that by appealing to the ear, instead of the eye, signals might be made in the night or in a fog, and by means of the steam whistle on board of the steamers the Morse alphabet might be sounded and any order whatever transmitted through the darkness. He soon had an opportunity of seeing that such a system would be exceedingly valuable.

When the landing of the infantry at Slocum's creek had been effected, General Burnside gave orders to the artillery to disembark and follow the army. But before the order was fully executed a second order was received for the artillery to reëmbark and proceed up the river. After they had departed, a thick fog settled over the river, and when an order was received at the flag ship to signal the artillery to land near the upper intrenchments, the officer of the flag ship found it impossible to transmit his signals, and the ship was cruising about all night in search of the artillery, in danger of running down some of the vessels. The result was the artillery did not receive their orders in time to participate in the battle. Had the system of signaling by steam whistles been in operation the orders could have been immediately transmitted, and probably the battle of Newbern would have been fought with one half of the actual loss in killed and wounded.

On Dr. Upham's return to Boston, he explained his idea to Joseph B. Stearns, Superintendent of the Telegraph Fire Alarm, and to the Superintendent of the Eastern railroad, who let them have the use of two locomotives to try the experiment. Sending one of them along the road 1½ miles, and out of sight, no difficulty was experienced in carrying on a conversation by means of the whistles—a result that would have been confidently anticipated.

Dr. Upham thinks that by means of trumpets the same system may be employed in the army, and that orders may be given by it in a battle. It would of course be easy to vary the alphabet so that the communications would not be understood by the enemy. This is a very important matter, and one that deserves the attention of our navy and army authorities.

ON the 28th ult. the new steam sloop-of-war *Canandaigua* was successfully launched from Charlestown Navy Yard, Mass. She is 226 feet long between perpendiculars, has 38 feet 5 inches extreme breadth of beam, and 25 feet depth of hold from the spar deck to the ceiling. She is beautifully modeled, has sharp ends and a round stern, and will be propelled by steam.

A COMPANY has been organized at Grass Valley, California, for the purpose of erecting gas works.

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RECENT PROGRESS OF THE PHOTOGRAPHIC ART.

The last number of the *North British Review* contains a long and most able article on the above subject from the pen, we think, of the venerable Sir David Brewster. The following are some abbreviated descriptions from it suitable for our columns. It is to the employment of two new materials—albumen and collodion—that photography owes the superiority of its pictures in almost all its most valuable applications. The value of albumen as a photographic material was discovered by M. Niepce de Saint Victor, in 1848, and it has been employed by photographers of all nations, but more successfully, perhaps, in Scotland, by Messrs. Ross and Thomson, who have produced a series of most splendid photographs, 15½ inches square, of architectural subjects. The following is the process which they have employed. Having taken the white of several eggs, add to them from 12 to 18 drops of the saturated solution of iodide of potassium, and beat the whole up into a mass of froth and then allow it to stand for ten or twelve hours until it becomes liquid. A portion of the liquid is spread upon the well-cleaned surface of a plate of glass which is then made to revolve at a moderate velocity, before a clear fire, by means of a twisted worsted thread. A very perfect film of albumen is thus spread over the surface of the glass plate, and when the film begins to crack at the edges it is withdrawn from before the fire. It is now prepared for the camera by dipping it into a bath containing a solution of nitrate of silver—70 grains to the ounce of water—to which is added about one-twentieth part of strong acetic acid. When the plate is taken out of this bath it is washed once or twice in pure water. It may be placed in the camera to take the picture before it is quite dry. If the object is luminous the picture will be taken in five minutes; but if there are red or green colors in it, a longer time is necessary. The picture is then developed on the glass by pouring upon the albumen surface a saturated solution of gallic acid, which is spread with a pad of cotton. When the solution has assumed a deep red color a little of the nitrate of silver solution is mixed with the gallic acid and spread over the surface. It now becomes dark in its shadow and sufficiently distinct. It is then fixed by pouring upon it a solution of the hyposulphite of soda, and afterward washing it repeatedly in pure water. From such negative pictures positives may be taken in the usual manner. The process is not suitable for portraits on account of the length of time required for impressing the image upon the albumen, but it is particularly good for landscapes, architectural and other still subjects. Plates prepared in this manner may be kept for a month ready for use. The sensibility of the albumen may be increased by the addition of grape sugar or honey. Mr. John Cramb, of Glasgow, in 1860 made a professional tour through the Holy Land, where he took a great number of pictures of scenes and interesting objects. All the plates which he used were prepared before he left England. He obtained good pictures after an exposure of the plate in the camera for fifteen and twenty seconds. The time for taking such pictures, however, depends entirely upon the light. It required an exposure of six hours with the same plates to take an interior view of the House of Lords, in London, because the light was about 1,600 times less than the diffused light outside.

The collodion process is simple and good, but many artists prefer the albumen system. Collodion is made by dissolving 15 grains of gun cotton in a mixture of nine fluid ounces of rectified sulphuric ether and one ounce of alcohol. To this quantity of collodion are added five grains of the iodide of potassium dissolved in the smallest quantity of alcohol and three ounces of sulphuric ether. This constitutes the preparation for photographs. In a room into which the light finds entrance through yellow or red glass, the plates are prepared by pouring the collodion from a bottle on the center of a plate, then inclining it so as to allow it to flow evenly over the entire surface. The ether evaporates rapidly leaving the collodion in a thin soft film upon the clean glass. It is now made sensitive by immersion in a bath composed of fused nitrate of silver 6 drams, iodide of potassium 3 grains, alcohol 12 ounces, and distilled water 2 drams. In combining these ingredients the nitrate of silver is dissolved in 1½ ounces, and the iodide in 1 dram of distilled water, and the two solutions are mixed and agitated in a glass vessel until the precipitate, which is at first formed, is redissolved. The remainder of the water and the alcohol are then added. The collodionized plate is kept in a bath of this solution for about two minutes when the temperature is at 60° Fah., but longer if the temperature is lower. The plate should be agitated and raised occasionally. When taken out of this bath, the superfluous liquor is drained off and the plate then placed in the camera to take the picture. The number of seconds required for this purpose depends upon the intensity of the light and the diameter of the lens. When the plate is taken out of the camera, the picture is sometimes seen upon it, but generally it is invisible. It is developed by pouring over its surface the following solution:—pyrogallic acid 6 grains, distilled water 5 ounces, glacial acetic acid 1 dram, alcohol ½ dram. It must be carefully poured upon the surface until the picture is fully developed. About 12 drops of a solution of nitrate of silver made by dissolving 50 grains in one ounce of water, if added to the developing solution, quicken and improve the action. When the picture is developed on the plate, its surface is washed by holding it horizontally and passing water over it. The next operation is fixing the picture. This is performed by pouring over it a solution of the hyposulphite of soda made by dissolving 4 ounces in a pint of water. Every trace of the hyposulphite must be washed away by repeated washings in cold water. If this operation is not carefully performed the picture will gradually fade. A spirit varnish made by dissolving amber in chloroform is then applied to preserve the picture from injury. Positive copies on paper may now be taken in the usual way, from the collodion negatives thus obtained. The wet collodion process is unsuited to a traveling photographer; he cannot employ it unless he prepares his plates at the time he requires them. A good dry collodion process, whereby the plates may be prepared and kept for a considerable time for use, has therefore become a desideratum for traveling artists.

Several dry processes have been successfully tried; any combining substance mixed with the collodion that will keep it moist, such as the nitrate of magnesia or the nitrate of zinc, will effect this object.

Photography is now a most extended art. It is applied to take pictures of the sun, moon, and stars; of mountains and valleys, forests and fountains. It is employed to copy the efforts of the most distinguished artists in steel and copper-plate engravings; and so accurate is the sun as a painter, that Mr. Dancer, of Manchester, England, has taken microscopic family groups in full-length pictures of seven persons on a space no larger than the head of a pin. Such pictures are now placed in rings, bosom pins and other articles of jewelry, in which they are magnified by plano-convex lenses cut to form the brilliants of the jewel. Stereoscopic photography constitutes, perhaps the highest branch of the art, but we regret to state that while many beautifully-colored stereoscopic pictures are taken, the great majority of those which are imported from England to America are mere daubs.

One great discovery has yet to be made to place photography on a higher elevation as one of the fine arts, namely, taking pictures with all these natural colors. Again and again has such a discovery been announced to the world, but the nearest approach to it has been made by Niepce de Saint Victor, who has been prosecuting his studies and experiments for several years in this direction. He has taken the natural colors on his pictures, but has not yet been able to fix them; and one great trouble experienced is, that different colors take different periods of time to develope, so that one disappears before the other comes out. Sir David Brewster does not deem the discovery of natural-colored photographs an impossibility. He says, "The sun-painter has yet to arrest the colors of nature and fix them upon his tablet; and though but a slight approximation to them has yet been obtained, yet we have no doubt that photography with color is a possible result of a scientific research." Who will be the fortunate discoverer?

FORCING air into a reservoir in a ship does not increase but diminishes her buoyancy.

DIALYSIS APPLIED TO THE ARTS—SILICA IN TANNING AND PRESERVING STONE BUILDINGS.

In a former volume we noticed the remarkable discovery which had been made by Professor Graham, Master of the Mint in London, viz., that certain substances possess the power of diffusing themselves with great facility through water in comparison with others, and that they could be separated mechanically in solutions by proper appliances. Thus, suppose we take four deep glass vessels, such as long phials, and place in the one a few grains of common salt; in the second an equal quantity of sugar; in the third some gum; in the fourth dried albumen. Let each of the glasses now be filled up cautiously with water, and their contents allowed to stand until they are dissolved by the water. In watching the operations it will be observed that these substances gradually diffuse themselves through the water, but not all in the same period of time. The salt diffuses most quickly, then the sugar in about twice the length of time; the gum takes four times longer, while the albumen takes about twenty times longer. So different is the diffusive power of common salt and albumen in water—though both are soluble—that if the two substances, in equal quantities, are mixed together in water, the salt will completely diffuse itself through the water before the other is dissolved. Those substances which are crystalline are the most diffusible; those least so which resemble gum, glue and albumen. Professor Graham has given the names *crystalloid* and *colloid* to these two classes of substances. The crystalloids also possess the remarkable property of diffusing through solutions of the colloids almost as rapidly as through pure water; while the latter do not possess this property.

A colloid and crystalloid in solution may be separated as follows:—Take a broad hoop, like that of a common wire sieve, and cover its bottom with parchment paper (paper treated in a peculiar manner with sulphuric acid) and float this vessel on clean water contained in another vessel, then pour into it a solution of common salt and albumen. In a short period afterward the salt will diffuse itself through the parchment, and leave the colloid or albumen behind. In this way compound crystalloid and colloid solutions may be separated. The parchment vessel is called a dializer, and it has been applied to the examination of the human stomach in a person supposed to have been poisoned by arsenic, which is a chrystalloid. The contents of the stomach were placed in a dializer, when the crystalloid passed through into the clean water in the under vessel, while the colloids, constituting the principal part of the food, remained behind. Dialysis may thus be usefully employed in a great number of cases of chemical analysis to facilitate operations.

Flint, which is one of the most insoluble of substances, has been obtained dissolved in pure water by the aid of the dializer. It cannot be dissolved in its natural state, but is first rendered soluble by a chemical process, then boiled in water and afterward separated by the dializer. Thus the flint is first fused with an excess of soda (or potash) which converts it into soluble water glass, or silicate of soda. It is now treated with hydrochloric acid, which unites with the soda and forms common salt. The latter is a crystalloid, the former a colloid. When placed in a dializer the salt solution passes through, while the silica is left behind, and when it is allowed to stand for some days it assumes the consistency of glycerine and afterward gelatinizes into a solid form. The London *Mechanics' Magazine*, in alluding lately to this new branch of practical science, states that a solution of silica thus obtained exerts a peculiar action upon gelatinous tissues, such as skins, and converts them into leather. It also suggested that "flint may yet be employed, as thus obtained, for tanning, as a cheap substitute for oak bark."

When some carbonate of lime is added to a solution of pure silica it becomes solid and as hard as flint. In dialysis we have perhaps the germ of a new and most valuable art, namely, the complete preservation of building stones liable to decay, and the conversion of the most perishable limestone into a hard and enduring silicious stone. It is well known that the chief objection to the use of all solutions of silicates of soda (soluble glass) for preserving stone, surfaces of buildings, &c., exposed to the

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weather from decay, has been its soluble character, it being combined with an alkali. By obtaining silica in a pure liquid condition by means of dialysis, a new and useful agent may be thus economically obtained, capable of application to a thousand purposes in the arts.

RECENT AMERICAN INVENTIONS.

The following are among the principal inventions for which patents have been granted through the Scientific American Patent Agency, for the week ending the 25th ult., and which will be found recorded in our list of claims on another page :—

Embroidering Machine.—This invention consists in an improved mode of obtaining and controlling a lateral or side-to-side movement of the perforating needle of a sewing machine in making button holes, in doing that kind of embroidery known as scalloping, and in doing any other sort of work in which such movement is necessary or desirable ; also, in a peculiarly-applied hook, and the mode of operating the same, in combination with the laterally-moving, perforating needle, and a shuttle for causing the needle thread to take a turn round the said needle, on the face or at the edge of the cloth in working embroidery, or in making button holes ; also, in an improved feed motion for moving the cloth in various directions ; also, in an improved mode of lifting the presser, to permit the turning of the cloth between successive stitches ; also, in an improved take-up motion, for taking up the slack of the needle thread ; also, in certain means of operating the shuttle, whereby the necessity of a raceway or of any fixed shuttle guide is entirely obviated. Patented by A. C. F. Derocquigney, Dominique Gance and Louis Hanzo, of New York City.

Hoop Skirts.—This invention, patented by O. R. Burnham, of No. 115 Franklin street, New York City, consists principally in the construction of skirt hoops, each of two or more narrow strips of steel or other metal, arranged edge to edge, and united by braiding or weaving them together, with cotton or other fibrous material, by which construction several important advantages are obtained. First, facility is afforded for inserting the clasps through the hoop. Second, the hoops are rendered more uniformly elastic, and less liable to get out of shape, for any soft place in one of the strips will be strengthened by the adjacent part of the other or others, it being very improbable that soft portions of two strips will be presented at the same part of a hoop. Third, the hoops, while being as stiff and elastic in a horizontal direction, are less stiff in a vertical direction, and so less liable to stick up when the wearer sits down.

Portable Stove.—This invention, patented by C. A. Stevens and J. V. Rockwell, of New York City, is to obtain a cook stove which may, when not required for use, be folded up, so as to form a flat and compact article and still be capable of being very readily unfolded and adjusted for use. It is more especially designed for camp or army use, but it may, in many cases, be advantageously used for ordinary domestic purposes, pleasure excursions, such as picnics, &c., where food is to be cooked and portable cooking devices are desirable. The invention consists in having the stove constructed with a folding or jointed front, sides and back ; the above parts being connected by joints to the top plate, and all arranged to effect the desired end.

Breech-Loading Gun.—In this gun the barrel is hinged upon an eccentric pin, by a partial rotation of which it is thrown forward to disconnect it from the breech and allow it to be turned up for loading. The charge being inserted in the stationary breech the barrel is allowed to descend, which action cocks and primes the piece automatically, and the barrel being again drawn back by the rotation of the pin, a tight joint is formed between the barrel and breech, and the piece is ready for firing. A succession of shots may thus be discharged with great rapidity, and as the entire operation of loading and firing may readily be performed with one hand, by resting the barrel over the arm or shoulder, the gun is especially valuable for horsemen. Invented by Henry Berg, of Davenport, Iowa.

Screw Press.—The object of this invention is to obtain a screw press of simple construction, which will admit of having its follower or plunger operated with a rapid movement while being adjusted to and from its work, and at the same time have its follower or plunger, when applied to or in contact with its work, capable of being operated with a comparatively slow speed and a proportionate increase of power, thereby economizing in time when power is not required. Patented by D. S. Gardner and N. A. Manning, of Greene, N. Y.

Double-Cylinder Revolver.—This invention consists in the employment in a revolver of two many-chambered cylinders, or series of revolving chambers, arranged breech to breech upon the same axis pin, so that when all the chambers in one of them have been discharged their position can be reversed, to enable the chambers in the other one to be discharged. It also consists in a hammer of peculiar construction, applied to operate in connection with such cylinders. Patented by C. E. Sneider, of Baltimore, Md.

Explosive Shells.—This invention, patented by M. S. Wickersham, of Philadelphia, Pa., consists in the construction or manufacture of explosive shells, with the interior surfaces, grooved, furrowed, corrugated or indented in various directions, for the purpose of causing their ruption at many points, or in many lines, instead of at a few points or in few lines, as is the case with the shells heretofore made with the interior surface of regular form, and of thereby greatly increasing their destructiveness.

Revolvers.—This invention relates to those revolvers in which a many-chambered cylinder, rotating on an anxis parallel with the bore of a stationary barrel is used. It consists firstly in a novel mode of applying and operating a wedge, in rear of the rotating-chambered cylinder, for the purpose of making tight joints between the chambers and the cylinder, while firing, but of permitting the cylinder to clear the barrel in revolving. It also consists in an improved mode of securing the cylinder axis pin to the breech frame, which admits of its easy withdrawal, to permit the removal of the eylinder. Patented by C. R. Alsop, of Middletown, Conn.

Card Cylinders.—It is well known by all who have had experience in carding cotton and other fibrous materials that there is some difficulty in keeping the fillet on the doffer and other carding cylinders tight. In grinding the card, the slack is all driven to one end, when it becomes necessary to unwind a portion of the fillet and rewind it. This requires the aid of at least three men, and has to be repeated several times a year. The object of this invention is to obviate the necessity of unwinding and rewinding the cylinder with a movable head or ring at one end, or otherwise making a portion of the same movable on its axis, that it will be turned relatively to the other portion, for the purpose of tightening up the fillet. Patented by C. E. Brownell, East Haddam, Conn.

Terrible Explosion of a Cartridge Manufactory.

On the morning of March 29th a terrific explosion took place at the cartridge manufactory of Mr. Samuel Jackson, Philadelphia, by which three employees were instantly killed, and a large number of others severely injured. At the time of the disaster, Mr. Jackson was completing a contract for the manufacture of 1,500,000 of Capt. Bartholomew's "solid waterproof cartridges," an article recently introduced into the market. Forty days was the limit of time within which the contract was to be completed and of these twenty days had expired, and the cartridges were being turned out at the rate of 75,000 per day. Seventy persons were employed on the place—fifty-eight women and girls, eleven men and nine boys. Edwin Jackson, a son of the proprietor, had charge, and was engaged for the most part in the mixing room. The powder used was the ordinary gunpowder, moistened with collodion. The composition thus prepared, while in a moist state, was taken to the molding room, The cartridge manufactured according to Bartholomew's patent have not an outer covering of paper. The form is given by driving the moist composition into a brass mold, an iron plunger and wooden mallet being used in this part of the process. The solid mass of powder is attached to the bullet with a thin and narrow strip of paper. The first explosion occurred in the molding room, where eight men and four boys were at work. The brass mold here used was placed on a bench, and the men were engaged in pouring the composition in, and then striking it a hard blow, in order to form the required shape. Charles Griffiths, who was at work in this department, and whose injuries are not so serious as those of some others, states that while glancing at one of the molds he saw it suddenly explode, and further than that he cannot tell. Two explosions followed the one in the molding room. The third and last was that of the magazine, located in the ground in one corner of the building, and which contained several barrels of powder. This factory—as all such dangerous establishments should be—was situated in an open lot.

The Paris correspondent of the *Photographic News* says :—Signor Polli, of Milan, has made some very remarkable experiments with a new antidote, which, if verified in practice, will lead to unexpected results in therapeutics. If putrid blood, or the glanders mucus, or pus, be injected into the femoral vein of a dog, general infection very soon manifests itself of a certainty. But if some days previous to the operation, we administer to the dog some sulphite of soda (150 grains in five days), the animal only experiences symptoms of disturbance during the first day ; it is dull, and refuses its food ; but soon recovers its appetite and liveliness. Whatever may be the theory of this phenomenon, the result is so important as to claim the attention of all hygienists, and cannot receive too much publicity.

Weight of Cannon Balls.—Assuming the specific gravity of cast iron to be 7 1-5th (7·207) times that of distilled water, and that the balls are perfect spheres—their weight will be as follows in pounds and tenths :—

Inches.	Weight. pounds.	Inches.	Weight. pounds.
3	3·7	9	99·4
4	8·7	10	136·3
5	17·0	11	181·4
6	29·4	12	235·2
7	46·7	15	460·0
8	69·8	20	1090·3

The repairs necessary to render the *Great Eastern* as seaworthy as possible are nearly complete, and it is stated that every part of the vast ship has been placed in working order. It is expected that she will sail for New York some time during this month.

New Publications.

Theory and Practice of the Movement Cure. By Chas. F. Taylor, M. D. A work of nearly 300 pages, and containing over 70 engravings, illustrating the art of healing disease by what the author calls "movement cure."

This art was first practiced in Sweden, where it became very popular, and is much practiced at this time. But in that country the patient is treated entirely by an attendant, who rubs, pounds, or otherwise manipulates the diseased portions of his patients, as directed by the physician in attendance. In the same manner Doctor Taylor commenced practicing some years ago the Swedish system of bringing the morbid portions of the human body into action and renewed life, by employing a number of attendants to exercise his patients somewhat after the manner a person exercises himself in a gymnasium, only far more gently. Being of an inventive turn of mind, and his patients becoming more and more numerous, it was not long before the Doctor invented and put in use, at his rooms in the Cooper Institute, a great variety of apparatus for the use of his patients, some of which are very ingeniously constructed, and on which he has obtained several Letters Patent. For curvitures of the spine he has a number of ingenious contrivances for his patients to stand and sit in, as the case may require. Another simple but effective and useful apparatus he has put in use for the treatment of constipation, dispepsia, lack of circulation, &c. He requires the patient to recline on a lounge, to which he is strapped, then two or more little beaters, attached to levers or arms are placed in close proximity to the patient, when a boy is set to turning a crank, which operates these beaters by an eccentric on the sides and the bowels of the patient, giving them pretty forcible agitation. Other contrivances he has also introduced, equally ingenious and useful in treating other complaints, and it will pay any person who feels an interest in the movement-cure system to pay the Doctor a call at his rooms, which are located in the Cooper Institute Building, junction of Third and Fourth avenues and Eighth street, New York. The book which the Doctor has just issued explains his theory of treatment, and the illustrations represent his apparatus and mode of operation on his patients in a lifelike degree.

Annual of Scientific Discovery for 1862. Edited by D. A. Wells, A. M. Published by Gould & Lincoln, Boston, Mass.

This is one of the most interesting of the series yet published, and contains much information relative to recent scientific progress, not to be found elsewhere, in any journal or work published in this country. The following are among the contents:—An enumeration and description of all the important facts and theories relative to warlike science, brought out in the United States or Europe during the year 1861; including notices of French and English iron-plated ships, the experiments of the English admiralty on the resistance of iron plates, the construction and use of steam rams, rifle muskets and cannon, shot, shell, floating batteries, Rodman's experiments on gunpowder, &c. A full and popular description, illustrated with engravings of Bunsen and Kirchhoff's wonderful process of spectrum analysis, and the consequent discovery of three new elements, and of the constitution of the sun's atmosphere. Fremy's discoveries on the nature and manufacture of steel. Discovery of the remains of a fossil man in the German cave. Further researches respecting the geological antiquity of man, embracing facts not hitherto published in the United States. New facts in American geology. The origin of American petroleum, or coal oil. The discovery of ten new asteroids. Airy's lecture on the solar eclipse of 1860. Leverrier's discovery of a new family of asteroids. The above are only a few of the multitude of interesting facts in every department of science. The volume also contains a finely engraved likeness of Capt. J. A, Dahlgren, Commandant U. S. Navy Yard, Washington, and originator of the famous "Dahlgren gun."

The California Farmer. Published by Col. Warren, of San Francisco.

The *Farmer* is an excellent and creditable sheet, and we should think it an excellent medium for inventors to publish their improvements in. California is a growing State, and good inventions will sell as readily there as in any other State in the Union. Terms for advertising : One-fourth column, 3 months, $30; one-half column, 3 months, $50; one column, 3 months, $80. Engravings of useful inventions can also appear in the columns of the *Farmer*. We hope some of our readers may find it to their interest to patronize this journal.

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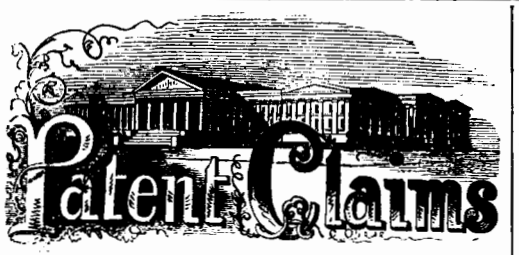

ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING MARCH 25. 1862.

Reported Officially for the Scientific American.

*** Pamphlets giving full particulars of the mode of applying for patents, under the new law which went into force March 2, 1861, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

34,728.—Abraham Bare, of Mexico, Ohio, for Improved Pans for Evaporating Saccharine Juices:

I claim, first, So constructing pans for evaporating saccharine juices as that in the first stages of evaporation it is done by the agency of fire alone, and in the second stages by steam, first closely confined and very hot, then in apartments less heated, until the desired effect is obtained.

Second, That particular construction of evaporator, wherein the same fire which evaporates in the first stages generates at the same time the steam for the second stages of evaporation.

Third, The double pan, constructed as described, the first lower section of which contains the generator, the second the steam chamber, and the third and additional sections for gradually decreasing the temperature, for the purposes set forth.

Fourth, The slide or valve between the steam chamber and the last section below, in combination with the double pan, substantially as and for the purpose described.

Fifth, The heater or supply pan, for water arranged as described, in combination with the generator, for the purpose set forth.

Sixth, The first pan, constructed as described, in combination with the second pan, when its separate sections are heated by different degrees of heat, for the purpose set forth.

34,729.—Henry Berg, of Davenport, Iowa, for Improvement in Breech-Loading Firearms:

I claim, first, The crank lever, F f, and eccentrically-flanged bolt, E e e′, constructed as described, and employed in connection with the hinged barrel, D d d′ and vertically-slotted breech, B, in the manner and for the purposes explained.

Second, The yielding lever, I i i′, constructed and employed in the manner explained, to raise the hammer by the depression of the barrel.

Third, The catch, K k, employed in the described connection with the sliding lever, I, to disconnect the self-cocking apparatus.

Fourth, The sliding plate, o, employed in the manner shown and explained, to cover the priming passage, M, or permit the withdrawal of the priming when desired.

34,730.—R. C. Bristol, of Chicago, Ill., for Improvement in Breech-Loading Ordnance:

I claim, first, Supporting the trunnions of a revolving breech upon movable blocks, acted upon by springs, in the manner described, for the purpose of freeing the breech from contact with the main barrel, when the pressure which forces the breech against the main barrel is removed.

Second, I claim so constructing and hanging the turning breech on trunnions and against a yielding force that when the breech is released it will automatically move out of contact with the main body of the cannon, and also automatically turn its bore to a vertical position, substantially as and for the purpose set forth.

Third, I claim the yoke, E, in combination with the ears, F, and wedges, m and t, in the manner and for the purpose, substantially as set forth.

Fourth, I claim the combination of a revolving breech, with the cams, i, springs, k, and wedges, l and m, substantially as described.

Fifth, I claim the rest, b, in combination with the revolving breech, B, for not only arresting the excessive automatic revolution of the breech, but for supporting it in a horizontal position, substantially as described.

34,731.—Albert Brown, of Troy, N. Y., for Improvement in Stove Grates:

I claim the arrangement of the transverse-barred grates, D, and studs, m, with the slotted pivoted levers, B B′, as shown and described.

The arrangement of the recesses, e, upon the sides, d, as and for the purpose shown and described.

[The object of this invention is to obtain a grate for stoves and furnaces, which will admit of being readily shaken or operated, without being liable to be obstructed or clogged with clinkers, a contingency of frequent occurrence with acting grates. It also has for its object durability, the warping of the grate frame by excessive heat being, it is believed, fully obviated.]

34,732.—F. E. Brown, of Hightstown, N. J., for Improvement in Cultivators:

I claim the combination of the adjustable slides, F, plates, G, slotted pendents, E, and connecting rod, H, with each other, and with the standard, I, in the manner shown and described.

The arrangement of the pendent-slotted bars, E J, slides, F K, plates, G L, rods, H M, standards, I N, and arms, l o, with each other and with the arms, q, links, j, arms, s, shafts, l, and lever, O, as and for the purpose shown and described.

[This invention relates to an improved plow for cultivating those crops which are grown in hills or drills, such as corn, potatoes and the like, and consists in a novel manner of attaching a series or gang of plows to a mounted frame, in such a manner that the plows are allowed to rise and fall to correspond to the inequalities or undulations of the surface of the ground, and at the same time rendered capable of being readily raised, when not required for use, above the surface of the ground, and also rendered capable of being adjusted at a greater or less distance apart, as well as being adjusted higher or lower, to penetrate the ground to the required depth.]

34,733.—Harvey Brown, of New York City, for Improvement in Chimneys for Lamps:

I claim the arrangement and construction of a lamp chimney, having a glass bulb for its base, with a sheet-metal tube attached above, substantially in the manner and for the purposes set forth.

Second, I claim the shade for this lamp chimney, constructed and arranged, substantially in the manner and for the purposes set forth.

34,734.—C. E. Brownell, of East Haddam, Conn., for Improvement in Cylinders for Machine Cards:

I claim providing the cylinder with a movable head, B, or otherwise making a portion of the same, to which one end of the card fillet is attached, movable about its axis relatively to the other portion thereof, to which the other end of the fillet is attached, substantially as and for the purpose specified.

4,735.—E. P. Brownell, of East Haddam, Conn., for Improvement in Crank Motion:

I claim the combination of an obliquely-sliding wrist pin, a spring and a stop, the whole applied in combination with the crank shaft and pitman, to operate substantially as and for the purpose specified.

[The object of this invention is to facilitate the passage of the crank wrist beyond the points commonly known in the crank motion as "dead points," and to this end it consists in so applying the wrist, in combination with a spring and stop, as to be capable of a movement independently of the crank shaft, in a direction oblique to the line occupied by the pitman when the wrist is at either of the mentioned points.]

34,736.—E. and A. Buckman, of East Greenbush, N. Y., for Improved Knife, Fork and Spoon-Cleaning Machine:

I claim a knife, fork and spoon cleaner, composed of the spring planes, E E, cylinders, H H′, ledge, G, arranged as set forth, and otherwise made as shown and described.

[The object of this invention is to obtain an implement of simple construction, which may be furnished at a moderate cost, and advantageously used for cleaning knives, forks and spoons.]

34,737.—O. R. Burnham, of New York City, for Improvement in Hoop Skirts:

I claim, first, The construction of skirt hoops of strips of steel or other metal, arranged edge to edge, and woven or braided together with fibrous material, so that each hoop shall be composed of two or more strips, substantially as specified.

Second, The combination in a skirt of tapes or straps, C C, woven double at the places where the hoops are connected, and single between those parts, hoops which are composed each of two or more strips of steel, united by weaving or braiding, as described, and are inserted through the double portions of the straps; metallic clasps passing through both the tapes or straps and the hoops, all as specified.

34,738.—James Canfield, of Sabula, Iowa, for Improved Gold Washer:

I claim the gold washer, constructed and operating in the manner and for the purposes substantially as delineated and set forth.

34,739.—Frank Chase, of South Sutton, N. H., for Improvement in Blind and Shutter Fastenings:

I claim the curved rod or bar, D, applied to the blind or shutter, C, as shown, provided with the lateral projection, b, and eye, f, and used in connection with the hook, a, and pin, e, attached to the window frame, A, substantially as and for the purpose set forth.

[The object of this invention is to obtain a blind and shutter fastening which will admit of the blind or shutter being opened and closed at the inner side of the window, without raising the sash, and one which will not admit of the blind or shutter being opened at the outer side of the window, nor allow it to be acted upon by the wind so as to rattle.]

34,740.—R. J. Colvin, of Lancaster, Pa., for Improvement in Combined Sword and Pistol:

I claim the arrangement and combination of a sword with a revolving pistol, when the said revolving pistol is arranged or attached to the back of the blade of the sword, in advance of the handle, by flanges or otherwise, as shown and described.

34,741.—J. D. Crocker, of Norwich, Conn., for Machine for Cutting Corks for Stoppers:

I claim, first, The tilting arms, G G, one or more, provided with the spindles, r*, and arranged in relation with the rotating cutter, E, in connection with the rotary arbors, H, one or more also placed on the arms, G G, and provided with the spindles, I, as and for the purpose set forth.

Second, Operating or sliding the spindles, I, so that they may grasp and release the corks at the proper time, by means of the bands or rings, J J, slide, M, spring, N, lever, O, and the shoulder, j, attached to the bar, k, as set forth.

Third, Rotating the arbors, H H, through the medium of the adjustable wheels, U U, on the shaft, S S, and the pinions, d d, on the arbors, H H, arranged as shown, so that the arbors, H H, may be rotated, as described.

Fourth, The levers, W, when used in combination and arranged in relation with the arms, G G, as shown, to operate as feeders, as set forth.

[The object of this invention is to obtain a machine for cutting corks for stoppers, which will perform the work rapidly and be capable of being readily adjusted, so as to cut the corks of cylindrical or taper form, as may be desired, and of any required degree of taper and size. It also has for its object a simple and automatically-operating means for clamping and holding the corks to be cut.]

34,742.—J. D. Custer, of Norristown, Pa., for Improved Lamp Burner:

I claim, first, The bevel lamp wick tube, B, and the mode of folding up the wide wick, or wicks, below the wick shaft, C, substantially as described and shown.

Second, The shade tube, D, and its spring, E, one or both, to be used on my burner or not, as desired, substantially as described.

Third, The regulating cap, F, to be used on my burner or not, as desired, substantially as described and shown.

34,743.—W. W. Davis, of Portland, Maine, for Improvement in Stove-pipe Thimbles:

I claim, first, The cubical box, B, whether constructed as represented in the drawings, with four of its sides only perforated with holes of various sizes and forms, the fifth whole and sixth removed, or whether all of its sides are so perforated, as and for the purposes specified.

Second, In combination with the above the case or safeguard, A, constructed as described, as and for the purposes set forth.

34,744.—R. O. Doremus and B. L. Budd, of New York City, for Improvement in Water-proofing Cartridges:

We claim the water proofing of compacted cartridges, made by compressing dry granulated powder, as set forth.

34,745.—Otto Ernst, of New York City, for Improvement in Tobacco Pipes:

I claim the combination of the inner tube, c, and follower, d, with the spiral spring, e, when constructed to operate in the manner and for the purposes, substantially as described.

34,746.—Adam and William Fischer, of New York City, for Improved Imitation Marble:

We claim the combination of matter, substantially as described, for the purpose of making artificial marble, in the manner and for the purpose, substantially as described.

34,747.—J. R. Finch and T. W. Henderson, of Dayton, Ohio, for Improvement in Seeding Machines:

We claim, first, The employment of the wheels, D D, provided upon their peripheries with the zigzag or cam flange, represented and with the lugs, a a, arranged and used upon the wheel and the flange, as is fully set forth, for the purpose specified.

Second, Pivoting the boot, H, to the drag bar, G, through the ear at the upper front end of the said boot, by means of the rod, J, which carries the roller, I, behind the boot, substantially as and for the purpose set forth.

34,748.—A. C. F. Derocquigny, D. Gance and Louis Hanzo, of New York City, for Improvement in Sewing Machines:

We claim, first, The combination with the sewing tube, F, and box, H, or other equivalent swinging guides for the needle bar, of a grooved plate, K, a lever, L, two switches, L L, and a pin, i, the whole applied and operating, substantially as described.

Second, The combination, with a laterally-moving needle and a shuttle, of a hook, p, applied to operate, substantially as described, with reference to Figs. 8 and 9.

Third, The feed mechanism, composed of the grooved dog, T, supporting point, 21, arm, T′, and curved bar, U′, the said bar deriving a reciprocating motion perpendicular to the bed of the machine, and the said arm being adjustable along the curved bar, substantially as and for the purpose specified.

Fourth, The described mechanism for lifting the pressure.

Fifth, Operating the shuttle by means of two reciprocating holders, Z Z′, which deliver it from one to the other, and in so doing pass it through the loops of the needle thread, substantially as described, without the use of any fixed guide in contact with the shuttle.

34,749.—D. R. Fraser, of Chicago, Ill., for Improvement in Packing for Pistons:

I claim, first, Adjusting within a piston, cut and uncut rings, so that both shall be free to move independently of the follower and piston head, substantially as described.

Second, The combination of the channels, f, and the passages, r, substantially as and for the purpose described.

Third, The use of the uncut rings, with face channels, t, for holding the cut packing ring steam tight, substantially as described.

Fourth, The combination of the uncut rings and the spring wedge, so that by the force of steam and the action of the wedge the cut ring shall be held both steam tight and distented, substantially as and for the purpose described.

Fifth, The combination of the piston-head valves, shouldered uncut rings and the cut ring, for the purpose set forth.

Sixth, The combination of the two springs, screw and wedge, substantially as and for the purpose described.

34,750.—D. S. Gardner and N. A. Manning, of Greene, N. Y., for Improvement in Presses for Compressing and Baling:

We claim the suspended nut and toothed wheel, D, and pinion, E, placed respectively on the screw, C, of the follower or plunger, B, and crank shaft, F, and arranged to gear into each other, in combination with the fixed ratchet, H, on shaft, F, and loose lever, I, provided with the pawl, J, all being arranged to operate as and for the purpose set forth.

34,751.—Edwin Gordon, of Taunton, Mass., for Improvement in Rotary Diggers:

I claim the combination of the draught bar, C, and adjusting lever, e, with the bar, g, upright, f, arm, b, and side cases, a, as and for the purpose shown and described.

The arrangement of the cylinders, A E, with each other, and with the gears, h i k l, as shown and described.

[This invention consists in the arrangement of two rotary-toothed cylinders, of unequal diameters, connected by a multiplying gear, in one common frame, which is provided with an adjustable hinged draught bar, in such a manner that by depressing said draught bar, whereby the front end of the frame is raised, the small digging cylinder is also depressed, and by raising the draught bar and a corresponding depression of the front end of the frame the digging cylinder is raised, and the depth to which the soil is operated upon is thereby regulated.]

34,752.—J. I. Herrick, of Milwaukie, Wis., for Improvement in Stoves:

I claim the flues, f f, removable pan, P, heating space, D, when combined with a heating stove, constructed and arranged to operate, as described.

34,753.—James Higgins and T. S. Whitworth, of Salford, England, for Improvement in Throstles for Spinning Cotton:

We claim as our invention, and as applied to machines in which a fixed tube is traversed to the copping rail, causing the part which so traverses to be capable of swiveling; also in reference to machines in which a tube passes into the bobbin, after the manner illustrated at Fig. 3, we claim so connecting the said tube to the copping rail that it shall be capable of swiveling.

34,754.—Jedediah Holcomb, of Brandon, Vt., for Improvement in Steelyards:

I claim the use of the open head, A, substantially as set forth, in combination with the beam of a steelyard, for the purposes described.

34,755.—Jared Holt, of Albany, N. Y., for Improved Device for Drawing in Trunk Stays:

I claim the arrangement of the springs, D, or their equivalent, in combination with the trunk stays, C, substantially in the manner and for the purpose shown and described.

[This invention consists in the arrangement of springs made of india rubber, metal, wood, shirring, webbing, or any other suitable material, in combination with the trunk stays, in such a manner that by the action of said springs the stays are drawn in and prevented getting between the edges of the lid and of the body of the trunk whenever the lid may be closed down.]

34,756.—C. H. B. Kellogg, of Arcadia, Ohio, for Improved Washing Machine:

I claim the arrangement described of the springs, 10 10, in combination with the rods, 14 14, bearing blocks, 9 9, hollow side pieces, 6 6, and the receptacle in which the clothes are to be washed, substantially as and for the purposes set forth.

34,757.—Henry Lowenberg, of Boston, Mass., for Improved Composition for Manufacture of Moldings and other Purposes:

I claim a composition made by combining starch and sawdust or comminuted wood by steam and by stirring them while under the influence of steam, so as to reduce them to a paste or dough capable of being molded and dried, and becoming flexible when dry.

And I also claim the combination of potash, or an alkaline equivalent, with the composition of starch and sawdust, while being treated as described, the same being for the purpose as above specified.

34,758.—A. E. Lyman, of Williamsburg, Mass., for Improvement in Candlesticks:

I claim the candlestick, as described, as a new article of manufacture, substantially as specified.

34,759.—J. D. Lynde, of Philadelphia, Pa., for Improved Bottle Stopper:

I claim the arrangement of the rubber packing, D, which gives it a tapering shape when not in use and causing it to make the joint as described, when pressed into the bottle.

The channels, B B, in the top of the stopper for the purpose set forth.

The device, Fig. 6, to attach the stopper to the neck of the bottle; the whole constructed and operated, substantially as and for the purposes set forth.

34,760.—J. P. Manny, of Rockford, Ill., for Improvement in Harvesters:

I claim, first, The triangular platform, E, when constructed and arranged, substantially in the manner described for the purpose set forth.

Second, The combination of the triangular platform, E, with the finger beam, D, and raker's stand or seat, L, when the whole are arranged in relation to the driving wheel, and substantially in the manner and for the purpose described.

Third, The combination of the platform, E, foot board, M, and raker's seat, L, as and for the purposes described.

34,761.—J. P. Manny, of Rockford, Ill., for Improvemen in Harvesters:

I claim, first, The combination of the converging gear frame, B, with the hinged diverging hounds, c, and rigid tongue, C, when arranged and operating, substantially in the manner and for the purposes described.

Second, The combination and connection of the gearing frame and finger beam with the horizontal frame, J, by means of both a flexible and a rigid connection, substantially as described, for the purpose of keeping the finger beam horizontal in every position, as set forth.

Third, Locking the caster wheel, K, for the purpose of preventing lateral motion of the machine when working on hillsides, substantially in the manner described.

34,762.—J. P. Manny, of Rockford, Ill., for Improvement in Harvesters:

I claim the combination of the driving wheel, A, and gear wheel, S, with the shield or guard plate, S′, constructed and arranged as and for the purposes described.

Second, The combination of the countershaft, t, with the sliding plate, x′, constructed, arranged and operating as described, for the purpose of throwing the mechanism into or out of gear.

34,763.—J. P. Manny, of Rockford, Ill., for Improvement in Mowing Machines:

I claim, first, Mounting the apparatus which regulates the hight of the finger beam on an extension of one of the hounds of the tongue, as and for the purposes described.

Second, The combination in a mowing machine of a finger beam, gearing frame, hinged tongue and driver's seat, when the whole are arranged and operated substantially in the manner described.

34,764.—M. H. Mansfield, of Ashland, Ohio, for Improvement in Clover Machine:

I claim the reversible cylinder, C, in combination with the self-adjustable box, D, primary and secondary hoppers, M N, with revolving feeder, O, as and for the purpose set forth.

34,765.—A. McGuffie, of Rochester, N. Y., for Improvement in Truss Bridges:

I claim the combination of the arch sections, A A, (either with or without the interposed heads or blocks, B B,) the posts, C C, the joint

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blocks, E, the links, D D, diagonal tension rods, a a, top chords, F F, and lateral braces, c c, the whole arranged substantially as specified.

[This invention consists in a novel arrangement and combination of arch sections, posts, links and braces by which a light, strong, stiff and easily-constructed bridge is obtained; also in a novel mode of combining the arch sections.]

34,766.—F. H. Moore, of Boston, Mass., for Improvement in Apparatus for Cutting Garments :

First, I claim in machines for cutting out garments, hanging the blade, f, to a reciprocating frame, so that the position or inclination of the blade with respect to the plane of the table, A, may be varied as required, substantially as specified.

Second, I claim bending forward or projecting a portion of the cutting edge of the blade, f, and extending the cutting edge below the bend, substantially as shown in Fig. 1, for the purpose specified.

34,767.—L. F. Noe, of New York City, for Improved Paddle Wheel :

I claim the combination of the middle arms, 2 2, forked or raised as described to receive the buckets from each side, with the straight arms, 3 3, the bent arms, 1 1, and the straight or flat buckets, 4 4, substantially as described, and accomplishing the purpose set forth.

34,768.—N. W. Northrup, of Greene, N. Y., for Improvement in Hot-air Stoves :

I claim E, the combination with the combustion chamber, B, of the double fire boxes, the revolving or swing grates, the air-heating chambers and flues, and the air passages, E, the governing dampers, m I I k k; the whole being constructed and operated substantially as described.

34,769.—N. W. Northrup, of Greene, N. Y., for Improvement in Coupling Shafting and Rods :

I claim the coupling made in two halves, as described, with the grooves, ribs or flanges and band or sleeve, and set screw, combined and for purposes set forth.

34,770.—M. J. Palmer, of Homer, N. Y., for Improvement in Churn Dashers :

I claim a horizontal churn dasher, with the slats or floats inclining in opposite directions upon opposite sides of the shaft, in combination with bars parallel with the shaft, with the horizontal U-shaped grooves closed at the ends, and so forming an air chamber as they pass into the cream.

34,771.—C. O. Parmenter, of Amherst, Mass., for Improvement in Machines for Forming Bonnets :

I claim the combination of the stretcher, H, with the clamps, D E, and former, J, the said parts being constructed and operating together as shown and described.

The combination of the movable suspension spindle, L, and adjusting wheel, I, with the stretcher, H, substantially as shown and described.

[The object of this invention is to obtain a machine for forming hats or bonnets from one or more pieces or sheets of palm-leaf fabric at one operation.]

34,772.—C. W. Pinkham, of Fond du Lac, Wis., for Improved Burning Fluid :

I claim the fluid for illuminating purposes composed of the ingredients substantiallly in the manner and proportions described and set forth.

34,773.—A. P. Pitkin, of Hartford, Conn., for Improvement in Apparatus for the Manufacture of Illuminating Gas :

I claim, first, Making the front or back plate (one or both) with one or more collars, c, cast or put on to them, cylindrical shape or otherwise, and sufficiently large to admit of the retorts removed when bulged or expanded from use, substantially as described.

Second, I claim making the retorts, d, with one or more flanges or rings, e, cast or put on to them, cylindrical shape or otherwise, and sufficiently large to fill the collars on the plate, a'.

Third, I claim forming an expansion joint for retorts by means of a liquid joint on the condenser or cooler, substantially as shown and described.

34,774.—Henry Port, of New York City, for Improvement in Metallic Molds for Casting Pumps :

I claim, in the manufacture of double-acting pumps, the employment of a metallic mold composed of the plates or sections, z and i, cores, a and b, and the core or outer shell of the mold, d, constructed and arranged substantially as described.

I also claim the slide, m, for the purpose set forth, when used in combination with a metallic mold for casting pumps.

34,775.—J. W. Ricker, of Boston, Mass., for Improvement in Corn Shellers :

I claim the combination and arrangement of the presser plate with the pistons, slotted guide tubes, follower and weights all acting together, substantially as set forth.

Also the formation of the surface of the shelling wheel in alternate depressions and elevations, both studded with teeth as shown and described.

34,776.—L. C. Rodier, of Springfield, Mass., for Improvement in Magazine Firearms :

I claim, first, A firearm in which the breech chamber is divided longitudinally throughout a portion of its length at or near the center of the bore, and the two parts hinged together at a point forward of the said division in the chamber when the two parts are so proportioned to each other and to the cartridge used that the cartridge shell shall extend forward of the forward end of this division, or joint, a sufficient distance to allow the shell to serve as a packing to the joint. The whole being arranged substantially for the purpose specified.

Second, The movable breech piece, E, when used in combination with a breech chamber constructed, as described, for the purpose of allowing the shell to be moved by the piece, C, in the manner substantially as set forth.

Third, The ring or ferrule, F, in combination with the breech piece, E, for confining it in its place, when operating substantially as described.

Fourth, The combination of the movable wedge-shaped breech-piece, with the magazine, G, having a spring for forcing out the cartridges contained therein, when said magazine is situated with relation to the bore of the breech chamber in such manner that the forward end of the magazine is a continuation of the bore of the chamber, so that the force of the spring in the magazine throws the cartridge directly into the bore of chamber without the intervention of other device.

34,777.—E. A. G. Roulstone, of Roxbury, Mass., for Improvement in Passing Boxes :

I claim making a passing, or other similar box, of the three separate layers of material, as described, and bringing the side edges together so as to unite them by one seam, as set forth.

I also claim constructing the cover, C, with the piece composed of a block of wood, n, or its equivalent, covered by leather, q, and its upper covering, p, they being connected to the top, as described.

34,778.—John Rush, of Philadelphia, Pa., for Improvement in Knapsacks :

I claim the combination of the arms, G G, and sheeting, k, either with or without the arms, M M, for the purpose of forming a bed of the knapsack, as described.

34,779.—Gelston Sanford and J. E. Mallory, of New York City, for Improvement in Machinery for Breaking Flax and Hemp :

We claim the combination of the series of feeding cords, or the equivalent thereof, a grooved surface, or the equivalent thereof, and beaters, substantially as and for the purpose described.

34,780.—J. B. Sacket, of Lawton, Mich., for Improvement in Machines for Dressing Millstones :

I claim, first, The picks, a a, clamps, a' a', nuts, c c and d d, and pick handles, b b, when all shall be constructed and arranged substantially as and for the purpose set forth.

Second, The employment of the sliding cylinder, C, when provided with pins, i i i, in combination with cog wheel, D, substantially as described.

Third, I claim the cylinder, E', when supported in the adjustable bearing described, in combination with thumb screws, r r, for the purpose set forth.

34,781.—Gelston Sanford and J. E. Mallory, of New York City, for Improvement in Machines for Scutching Flax and Hemp :

We claim arranging two series of scutching bars on two sets of hubs and arms, or on two sets of heads or wheels, as the equivalent thereof, the two series being geared to rotate in opposite directions and with equal velocity, and set so near that the bars constituting each series shall, in the rotation, pass in the spaces between the bars constituting the other series, and near to the axis of rotation, as described and for the purpose set forth.

34,782.—James Sangster, of Buffalo, N. Y., for Improvement in Lamps :

I claim the described lamp burners constructed as represented, to wit: With the cone, K, corrugated around its upper aperture, and terminating in points at its lower extremity, the flange, A, and the wick tube, B, provided with gutters at its top and having its edges bent together, as described; the several parts being constructed and arranged together for forming a lamp burner, as is fully set forth.

34,783.—C. B. Sawyer, of Fitchburg, Mass., for Improvement in Hot-air Registers :

I claim combining a water chamber with a hot-air register in such a manner that the hot-air pipe shall pass through the water chamber, substantially as set forth.

[The object of this invention is to obtain a register which may be constructed much cheaper than the ordinary kind, be applied with far greater facility and which will admit of the use of an ordinary circular damper or valve, and a water chamber, the latter supplying the heated air with moisture previous to its advent into the apartment.]

34,784.—A. G. Searls, of Cleveland, Ohio, for Improvement in Churns :

I claim the attachment of the beaters, C C, to a revolving disk or cover, B, in combination with a square casing, A, as and for the purpose described.

34,785.—W. H. Seymour, of West Hartford, Conn., for Improvement in Heaters :

I claim, first, The combination of the water belt, D, Fig 1, and its connecting points, F, with the air space, C, extending from the fire pot, A, to the said water belt, substantially as represented, and for the uses set forth.

Second, I claim the combination of the flange radiators, E, Fig. 1, projecting from the water belt, D, into the air space, C, with the flange radiators, B, projecting from the fire pot, A, substantially as and for the purposes represented.

Third, I claim the peculiar construction and arrangement of the upper section of the device, represented in Figs. 7 and 10, including its pipes, J, K and N, and its caps, L and M, substantially as and for the purposes specified.

34,786.—S. B. Skiff, of New Bedford, Mass., for Improved Vise for Holding and Swaging Horseshoes :

I claim a hinge vise, A' B', with the movable and adjustable dies, G' G', affixed to the jaws, J' J', on which to form the calks of shoes, the treadle, D', and friction wheel, E', constructed and operating substantially as and for the purpose set forth and described.

34,787.—Joseph Slocum, of Syracuse, N. Y., for Improvement in Potato Diggers :

I claim the combination of the standard, C, with the undulating or double-concave-removable share, H, and rods, arranged and operating in connection with the adjustable plates, F, bars, E, and bar D', as and for the purposes shown and described.

[The object of this invention is to obtain an implement or device which may, by a very simple adjustment, be used either as a potato digger or as a cultivator, and perform its work in either capacity equally as well as if it were constructed especially for each.]

34,788.—C. W. Smith and T. D. Stetson, of New York City, for Improvement in the Plungers of Concussion Shells :

We claim the use of soft material such as lead or its equivalent in the percussive mechanism of shells, substantially in the manner and so as to produce the effect set forth.

34,789.—Carlos Stebbins, of Pike, N. Y., for Improvement in Sewing Machines :

I claim, first, Obtaining the movement of the needle of a sewing machine from a crank or its equivalent through the agency of a pitman and toggle joint, e, applied and arranged in combination with the said crank or equivalent to operate substantially as specified.

Second, Transmitting motion from the crank, A, or its equivalent to the vibrating feed bar, K', by means of a system of levers, C G H M O, and connections and slide, X, arranged, applied and operating substantially as set forth.

[This invention consists in obtaining the movement of the needle of a sewing machine from a crank or its equivalent, through the agency of a pitman and toggle, by which means such a movement of the needle is obtained as is most desirable to provide for the passage of the shuttle in its equivalent through or into the loops of the needle thread.]

34,790.—J. H. Stevens, of East Durham, N. Y., for Improvement in Machines for Spreading Manure :

I claim, first, The arrangement of the endless flexible bed, C, woodlass shaft, J, and its connections in combination with the buckets, D, spring, f, and conducting tubes, G H I, the whole combined and operating in the manner and for the purpose described.

Second, The arrangement of the endless flexible bed, C, rollers, B B, sides, A, conducting tubes, G H I, and framing, F, the whole supported upon wheels and operating in the manner and for the purpose described.

[This invention consists in the employment of an endless flexible belt for the bottom or flooring of a wagon body and arranging in connection therewith a series of buckets and conducting tube, whereby the same wagon that is used for hauling is made to automatically deposit the manure upon the field in hills or in drills as desired.]

34,791.—C. A. Stevens and J. V. Rockwell, of New York City, for Improvement in Portable Stoves :

We claim the combination of the top plate, A, furnished with holes and having covers attached to the plate, as shown, with the side plates, C C, back plate, B, and doors, D D, the whole constructed and hinged together to make a folding stove, substantially as set forth.

34,792.—M. L. & O. A. Stray, of Willoughby, Ohio, for Improvement in Fruit Baskets :

We claim the combination of the perforated cover and basket when the same are constructed and secured together as and for the purpose specified.

34,793.—F. G. L. Struve, of Jefferson, Wis., for Improvement in Feed Racks :

I claim the arrangement of the notched arms, D D', or their equivalents in combination with the movable rack or racks, A A', constructed and operating substantially in the manner and for the purpose shown and described.

[An engraving and description of this invention will appear in our next number.]

34,794.—David Tanquary, of Carmi, Ill., for Improvement in Stump Extractors :—

I claim the application, combination and arrangement of the sweep, G, the hook, E, the spring F, the nut as seen in Fig. 3, and the rod, I, constructed as described and operating as and for the purposes, substantially as set forth.

34,795.—L. H. Thomas, M. D., of Waterbury, Vt., for Improved Clothes Wringer :

I claim the shape and construction of the self-adjusting block, K, and spring, N, combined as described, as and for the purpose specified.

34,796.—G. W. Walker, of Boston, Mass., for Improvement in Stoves :

I claim a stove made or furnished with a discharging spout or conduit, or its equivalent, and a rake-receiving passage leading from its ash chamber, substantially as described, whereby ashes may be raked or discharged from the said ash chamber into a covered pail constructed with an ash, receiving hole or induction pipe to communicate with the ash chamber through the discharging opening or spout thereof, as explained.

34,797.—Maximilian Wappich, of Sacramento, Cal., for Improved Apparatus for Shipping Spare Rudders :

I claim providing the sterns of vessels and their rudders with reserve braces, pintels and steps, substantially in the manner and for the purpose set forth

I claim a rudder having a metal bearing, E, in combination with a cross bar, L, springs, M and M', encircling boxes, K, substantially in the manner and for the purpose specified.

I claim the rudder yoke, O, having lips, V, in combination with the vertical pins, T, and cylinders, U, the whole arranged and operating substantially in the manner and for the purpose set forth.

For shipping and unshipping vessel rudders, I claim the application of a shipping tong, W, substantially in the manner and for the purpose described.

34,798.—M. S. Wickersham, of Philadelphia, Pa., for Improvement in Explosive Shells for Ordnance :

I claim the construction or manufacture of explosive shells with their interior surfaces grooved, furrowed, corrugated or otherwise indented, substantially as and for the purpose specified.

34,799.—Abel Wilson, of Frankford, Pa., for Improvement in Soldering Irons :

I claim the tapering jaws, B and B', adapted to receive the tapering shank, d, of the copper bar, and secured to or forming a part of the stem, A, in combination with the tapering ferrule, G, and the nut, H, or its equivalent, the whole being constructed and arranged substantially as and for the purpose set forth.

34,800.—A. B. Wilson, of Waterbury, Conn., for Improvement in Photographic Cameras :

I claim, first, A negative plate and bath holder having a hollow journal, channel and throat constructed and operating substantially as and for the purposes described.

Second, The hollow journal described for introducing and withdrawing the baths.

Third, The combination of a negative plate and bath holder, having a hollow journal, channel and throat, as one instrument, with the crooked stem funnel, constructed and operating substantially as described.

Fourth, Giving the combined negative plate and bath holder the capacity of assuming horizontal and perpendicular positions at will, in the manner and for the purposes described.

Fifth, The combination of camera box, crooked stem funnel, hollow journal, channel and throat, and fluid-tight holder, substantially as described.

34,801.—E. F. Woodward, of Brooklyn, N. Y., for Improvement in Coffee Boilers :

I claim causing a circulation by means of a tubular or channel-formed bottom, as set forth.

I also claim forming the tubular bottom by means of one or two corrugated plates, as specified.

I also claim, in combination with the circulating apparatus, the receiver specified.

I also claim the cone, c, or its equivalent, for conveying heat to the upper reservoir, d, as described.

34,802.—William Boyers (assignor to J. L. Livingston and J. B. Shaffer), of Mount Carroll, Ill., for Improved Rotating Clothes Dryer :

I claim the combination of the spiral grooved, bell-shaped flanged pulleys, attached by braced projections to a building or placed upon three or more posts in connection with the endless cord, all arranged substantially as and for the purpose specified.

34,803.—C. R. Alsop, of Middletown, Conn., assignor to J. W. Alsop, of New York City, for Improvement in Revolving Firearms :

I claim the arrangement of a wedge, H, with the rear of the recoil shield shaft, F, and stationary abutment or bearing, G, substantially as shown and described for the purposes set forth.

34,804.—S. T. Holly (assignor to Mary Manny), of Rockford, Ill., for Improvement in Harvesters :

I claim the combination of a caster wheel with a tongue in advance of it and with the part of the machine that is behind it, by means of a compound spindle box fitted with lateral trunnions, and with fastenings for the tongue the combination as a whole being substantially as described.

I also claim the combination of the cutter frame of a harvester, the hinged part of the machine which precedes it, a thrust bar jointed to one portion of the machine, and an elevated driver's seat and standard secured to the other portion of the machine, in such manner that the driver can exert the muscular force of both his leg and arm in elevating the finger beam, substantially as set forth.

I also claim the combination of the thrust bar with a rack and spring catch, the former being secured to the thrust bar and the latter being connected with the standard to which the attendant's hand is applied when the finger beam is to be raised or lowered, substantially as set forth.

I also claim combining the driver's seat with the frame of the machine, by means of the frame of the rake mechanism, so that this last frame performs two functions, substantially as described.

I also claim the combination of the main gathering arm of a rake with a crank that moves in a horizontal plane or thereabouts, and with a rake crane having a cam plate that is horizontal or thereabouts; the combination as a whole being and operating substantially as described.

I also claim the combination of the projecting end of the secondary gathering arm of the rake with an arm of the crane that is at the same side of the crane axis, by means of a radius bar pivoted to the arm between the axis thereof and the main gathering arm of the rake, substantially as described.

I also claim the combination of the palm with the part of the rake mechanism that supports it, by means of a joint located at or near the lower edge of the palm, and a spring that causes the palm to turn upon this lower joint, substantially as described.

I also claim the combination of an intermediate cog-wheel shaft of the rake mechanism with an oscillating box operated by a lever, substantially as described.

34,805.—W. H. Matthews, of Chelsea, Mass., assignor to Williams & Co., of Boston, Mass., for Improved Lamp Shade Holder :

I claim the improved shade holder as made with a contractile ring and with its springs provided with jaws, i, so as to operate with such ring and against the paper shade, substantially as described.

I also claim the arrangement and combination of the inner ring with the springs made with the jaws, as described, whereby the said springs and inner ring may be employed to hold the lamp shade to the outer or main ring.

34,806.—B. L. Budd, of New York City, for Improvement in Shot Cartridges :

I claim the method of forming fixed charges of shot so as to be capable of being used without wrappers or cases of any kind, by pouring among the shot while in a mold some easily fusible material, as grease, stearine, &c., which on cooling will fix the shot, and when discharged from the mold will retain said shot in the order and form they took in the mold, in the manner and for the purpose described.

I also claim, in combination with the above, the method of connecting the cut wads to the two ends of the charge by a leaden wire or rod, or other equivalent material, passing into or through the mass of shot, as described.

RE-ISSUES.

1,292.—C. T. Eames, of Milford, Mass., for Improvement in Boot-trees. Patented May 27, 1856 :

I claim a boot-tree distended by means of a single cam or wedge attached to a stretching rod, D, at its lower end and traversing upon an inclined plane located in the back, A, at or near its lower end, the same operating substantially in the manner set forth.

1,293.—A. P. Griffing, of East Cambridge, Mass., for an Inkstand. Patented Feb. 4, 1862 :

I claim the inkstand the caps, b f, of which are made to operate substantially in the manner specified.

1,294.—D. B. Neal and G. E. House (assignees of D. B. Neal, H. C. Emery and G. E. House), of Mount Gilead, Ohio, for Improvement in Apparatus for Evaporating Saccharine Juices. Patented Feb. 21, 1860 :

We claim, first, Leading a current of cold air under the bottom of the sugar pan, for the purpose of facilitating the removal of the scum, substantially in the manner described.

Second, Cooling that portion of the pan from which the molasses is about to be withdrawn, without interrupting the boiling of the crude juice in the other portions of the pan, substantially in the manner described.

1,295.—C. S. Buchanan, of New York City, assignee of J. T. Coupier and M. A. C. Mellier, of Paris, France, for Improvement in the Preparation of Paper Stuff. Patented August 2, 1853. Ante-dated May 7, 1851 :

We claim, first, Treating straw with pure caustic alkali, (previously

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freed from lime), for loosening the color preparatory to the bleaching process, substantially in the manner and for the purpose set forth.

Second, The circulation of the caustic fluid through the stock so as to availourselves of repeated chemical action on the fibrous material, substantially in the manner and for the purpose set forth.

Third, In combination with the alkaline treatment of straw, as described, we claim the use of the hypochlorites as described and for the purpose set forth.

1,286.—Moses Marshall, of Lowell, Mass., assignor to S. S. Bucklin, of Brookline, Mass., for Improvement in Pegging Machines. Patented Nov. 5, 1861:

I claim a feeding point so arranged and operated as to enter the hole previously made by the awl, and to move the machine along for the purpose set forth.

DESIGNS.

1,556.—E. J. Ney (assignor to the Lowell Manufacturing Company), of Lowell, Mass., for Design for a Carpet Pattern.

1,557.—W. W. Stevens (assignor to N. P. Richardson & Co.), of Portland, Maine, for Design for a Cooking Stove.

PATENTS FOR SEVENTEEN YEARS.

The new Patent Laws enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the government fee required on filing an application for a patent is reduced from $30 down to $15. Other changes in the fees are also made as follows:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for Design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, excepting reference to such countries as discriminate against citizens of the United States—thus allowing English, French, Belgian, Austrian Russian, Spanish, and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms.

During the last sixteen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by the Inventors throughout the country, we would state that we have acted as agents for more than FIFTEEN THOUSAND Inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of Inventors and Patentees at home and abroad. Thousands of Inventors for whom we have taken out Patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the Inventors whose Patents were secured through this Office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than are employed at present in our extensive Offices, and we are prepared to attend to Patent business of all kinds in the quickest time and on the most liberal terms.

The Examination of Inventions.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a reply written corresponding with the facts, free of charge. Address MUNN & CO., No. 37 Park-row, New York.

Preliminary Examinations at the Patent Office.

The advice we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a Patent &c., made up and mailed to the Inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh-streets, Washington, by experienced and competent persons. More than 5,000 such examinations have been made through this office during the past three years. Address MUNN & CO., No. 37 Park-row, N. Y.

How to Make an Application for a Patent.

Every applicant for a Patent must furnish a model of his invention. If susceptible of one; or if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the government fees by express. The express charge should be prepaid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of Munn & Co. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & Co No. 37 Park-row, New York.

Caveats.

Persons desiring to file a Caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The government fee for a Caveat, under the new law, is $10. A pamphlet of advice regarding applications for Patents and Caveats, in English and German, furnished gratis on application by mail. Address MUNN & CO., No. 37 Park-row, New York.

Forcign Patents.

We are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business, we have offices at Nos. 66 Chancery-lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through our Agency.

Inventors will do well to bear in mind that the English law does not limit the issue of Patents to Inventors. Any one can take out a Patent there.

Circulars of information concerning the proper course to be pursued in obtaining Patents in foreign countries through our Agency, the requirements of different Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park-row, New York, or either of our Branch Offices.

Rejected Applications.

We are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief history of the case, inclosing the official letters, &c.

Assignments of Patents.

The assignment of Patents, and agreements between Patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park-row, New York.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with Patent property or inventions to call at our extensive offices, No. 37 Park-row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid), should be addressed to MUNN & CO., No. 37 Park-row, New York.

Notes and Queries

W. R. H., of N. J.—Capt. Ericsson has no patent for the method of iron plating adopted in the construction of the *Monitor*. We do not think it embraces any novelty of a patentable character.

P. S., of Pa.—Since our answer to you respecting the Prussian needle gun, we have learned that information may be obtained respecting it, from C. T. Burchardt, No. 94 Eldridge street, this city.

S. L., of N. Y.—We have never seen a copy of Mr. Chadwick's pamphlet. It cannot be procured in this country. We read a review of it in an English work.

F. G. W., of Mass.—It is perfectly understood by Capt. Ericsson, as well as others, that inclined plates will deflect shot far more easily than perpendicular ones will repel them; and the latter are adopted only from the exigencies of construction and working.

A. W., of N. Y.—It will require a pipe 16 inches in diameter to carry the water that passes through a gate having 200 square inches of opening in the gate. The quantity of water under six feet head will be 16·972 cubic feet per second. This will be 2·828 cubic feet for every foot of the wheel moving at 6 feet per second. Make your buckets of such depth and width as will take in this quantity of water. There is a great variety of opinions among millwrights respecting the width and depth of buckets to be used on a wheel. The power 16·972 cubic feet of water per second on a fall of 6 feet is 11-horse, on a wheel it will give out about 8-horse power.

G. G. Van W., of Wis.—Petroleum is distilled and also treated with sulphuric acid, an alkaline solution, and several washings in water to fit it for burning in lamps.

B. A., of Conn.—You cannot obtain a patent for employing malleable iron as a substitute for steel as this is simply the substitution of one well known metal for another, and does not constitute an invention. You can, however, obtain a patent for any improvement which you may have made in the manufacture of malleable cast iron.

L. W. S., Mich.—Pressure rollers for crushing sugar cane have been arranged in substantially the same way as you suggest. You cannot therefore obtain a patent on the device.

W. H. G., of Ohio.—Dip your small iron castings, after they are cleaned, into warm asphalt varnish, then dry them in an oven and you will find the process more speedy and effectual than painting them with a brush. You can purchase asphalt varnish cheaper than you can manufacture it on a small scale.

E. Y., of Ohio.—An overshot or breast wheel is best for a head of 10 feet on a saw mill, where the quantity of water varies, and the power required to saw different kinds of lumber, also varies.

J. W. & A. S., of N. Y.—A wrought-iron shaft for a motor of 100-horse power to run 125 revolutions per minute should be 4·52 inches in diameter. The elasticity of wrought iron to cast iron is as 4110 to 2285. From this data you may calculate the thickness of shaft which you will have to adopt if you use cast iron. We would prefer the wrought iron shaft, especially if the quantity of water which you use for your wheel varies. If you run the wheel at a less velocity than above stated, you must use a thicker shaft.

F. & S., of Ohio.—We are not acquainted with any substance which can be used as a substitute for india rubber for all the purposes that this elastic resin is now used. Gutta percha, is used as a substitute for it in some cases.

E. G. D., of Mich.—We have received your fine club of subscribers and are very much obliged for your kind efforts to extend the circulation of our journal in the copper regions. We will endeavor to procure such information as you want in regard to iron cartrungs, &c. In reference to the opening of a military road through that region, the subject has never been presented to us in its practical bearings.

M. T. K., Wis.—Tin spouts for cans, coffee pots, &c., have been formed by swaging them of the proper form and of two longitudinal parts and connecting the parts by solder. It is estimated that ten cubic feet of pure air per minute for the respiration of an adult person is necessary for comfort and safety, and, that in a close apartment of only 600 cubic feet, a single person cannot spend six consecutive hours, in air of ordinary temperature, without impairment to health.

M. D., of N. Y.—If the form of your boiler is the same as that of the boiler you have referred to, it is not patentable.

J. D. L., of.—We cannot advise respecting the novelty of your proposed improvement without the aid of a sketch and description of it. If your combination is new and useful it is certainly the subject of a patent, even though the devices when separate are old.

H. M., of N. Y.—The floating power of a body is just equal to the weight of the water which it displaces, minus its own weight; and the floating power of a board is precisely the same in whatever position it is placed in the water.

J. M. C., of Mass.—See answer to J. R. on page 206.

J. W. H., of N. Y.—If you will construct the simple apparatus described on page 200, Vol. II. (new series) SCIENTIFIC AMERICAN, you will be able to thoroughly understand the precession of the equinoxes, and to answer Prof. Loomis yourself. The idea that this subject is not comprehended by astronomers is just as absurd as it would be to say that Lindley Murray did not know the difference between a noun and a preposition.

SPECIAL NOTICE—FOREIGN PATENT.—The population of Great Britain, is 30,000,000; of France, 35,000,000; Belgium, 5,000,000; Austria, 40,000,000; Prussia, 20,000,000; and Russia, 60,000,000. Patents may be secured by American citizens in all of these countries. Now is the time, while business is dull at home, to take advantage of these immense foreign fields. Mechanical improvements of all kinds are always in demand in Europe. There will never be a better time than the present to take patents abroad. We have reliable business connections with the principal capitals of Europe. Nearly all of the patents secured in foreign countries by Americans are obtained through our agency. Address Munn & Co., 37 Park row, New York. Circulars about foreign patents furnished free.

Money Received

At the Scientific American Office on account of Patent Office business, during one week preceding Wednesday, April 2, 1862:—

M. L. B., of Mich., $45; McK. and F., of N. Y., $20; A. S. J., of Ill., $20; G. G. L., of Del., $20; A. McF., of Wis., $20; J. W. B., of N. Y., $20; J. S. S., of N. Y., $15; G. and J., of R. I., $30; H. V. F., of Ind., $15; W. P. T., of N. Y., $40; A. B., of N. Y., $15; T. V. N., of Ill., $15; C. T. W., of Mass., $15; M. and H., of Mass., $25; O. L. R., of N. H., $15; S. M., of Del., $15; J. S., of Ill., $30; N. and B., of N. Y., $15; J. R. B., of Ind., $15; H. T. H., of N. Y., $10; J. W. S., of N. J., $15; A. B., of Conn., $15; F. A. De M., of N. Y., $15; O. N., of N. Y., $25; A. C. C., of N. Y., $15; G. B. W., of N. J., $15; O. S., of N. Y., $15; S. E. S., of N. Y., $25; C. W. C., of N. Y., $25; D. D. S., of N. J., $25; J. G., of N. Y., $25; J. R. B., of Ind., $20; W. B. B., of Mich. $20; G. and B., of Mich., $20; J. E. S., of N. Y., $20; E. F. B., Conn., $20; J. H., of N. Y., $20; D. S., of Cal., $100; W. G., of Mass., $40; C. G. P., of Ind., $25; E. Y. C., of Ind., $10; I. C., of N. J., $25; D. H., of N. H., $15; J. L. J., of N. Y., $40; J. A. F., of O., $15; G. T., of Mass., $25; W. H., of Iowa, $25; G. O. L., of Iowa, $15; C. E. S., of Md., $15; D. T. Y., of Ind., $100; A. J. K., of N. Y., $20; E. L of Austria, $15; W. C. L., of N. Y. $15; A. F. W., of N. Y., $15; J. C. C., of Vt., $15; W. B. B., of Conn., $40; T. H. R., of Mass., $15; J. S., of N. Y., $25; A. B., of N. Y., $25; H. V. McK., of N. J., $25; J. L. R., of Wis., $20; H. Y. B., of N. Y., $43; J. M. H., of Va., $20; W. H. E., of Va., $15; W. H. D., of N. Y., $20; S. T. D., of N. J., $25; J. R. and J. A. S., of Ill., $15; F. A. R., of Mich., $45; W. T. and J. G., of Cal., $121; T. Y. and others, of Pa., $12; W. S. S., of N. Y., $22; W. H. W., of N. J., $15; O. E. M., of Ill., $10; W. B., of Iowa. $25; J. M. M., of Conn., $15; J. S., of Mo., $15; J. M., of Pa., $15; A. A. P., of Mass., $25; R. H. G., of N. Y., $15; E. M. C., of N. Y., $15; H. W., of Vt., Vt., $25; J. P., of N. Y., $54; M. P. L., of Me., $15; O. C. S., of Mass., $15; A. C. F., of Iowa, $15; W. R., of Cal., $15; S. S. W., of Pa., $30; C. E. R., of N. Y., $25; W. S. S., of N. Y., $12; W. A., of N. Y., $45.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from March 26 to Wednesday, April 2, 1862:—

B. and H., of N. Y.; G. and J., of R. I.; M. and H., of Mass.; S. A. B., of Conn.; I. C., of N. J.; D. D. S., of N. J.; G. T., of Mass.; J. S., of N. Y.; J. P., of N. Y., 2 cases; H. V. McK., of N. J.; A. A. P., of Mass.; W. A., of N. Y.; W. B., of Iowa; J. S., of N. Y.; A. B., of N. Y.; S. T. D., of N. J.; T. Y. and others, of Pa.; H. W., of Vt.; S. E. S., of N. Y.; O. N., of N. Y.; M. P. L., of Me.; W. H., of Iowa; W. H. E., of Va.; C. W. C., of N. Y.; C. E. R., of N. Y.; C. G. P., of Ind.; F. A. R., of Mich.; W. S. S., of N. Y.; W. R., of Cal.; J. G., of N. Y.; W. C., of Ohio; H. T. H., of N. Y.

TO OUR READERS.

Models are required to accompany applications for Patents under the new law, the same as formerly, except on Design atents, when two good drawings are all that is required to accompany he petition, specification and oath, except the government fee.

NEW PAMPHLETS IN GERMAN.—We have just issued a revised edition of our pamphlet of *Instructions to Inventors*, containing a digest of the fees required under the new Patent Law, &c., printed in the German language, which persons can have gratis upon application at this office. Address MUNN & CO.,
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VOLUMES I., II., III., IV., V. (NEW SERIES) COMplete (bound or unbound) may be had at this office and from all periodical dealers. Price, bound, $1 50 per volume, by mail, $2—which include postage. Price, in sheets, $1. Every mechanic, inventor or artizan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding.

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INVENTORS AND CONSTRUCTORS OF NEW AND useful Contrivances or Machines, of whatever kind, can have their Inventions illustrated and described in the columns of the SCIENTIFIC AMERICAN on payment of reasonable charge for the engraving.

No charge is made for the publication, and the cuts are furnished to the party for whom they are executed as soon as they have been used. We wish it understood, however, that no secondhand or poor engravings, such as patentees often get executed by inexperienced artists or printing circulars and handbills from, can be admitted into these pages. We also reserve the right to accept or reject such subjects as are presented for publication. And it is not our desire to receive orders for engraving and publishing any but good Inventions or Machines, and such as do not meet our approbation in this respect, we shall decline to publish.

For further particulars, address—

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WANTED—PATENTEE.—ANY PERSON PAYING the expenses of procuring the Patent on a combined Caliper, Divider, Square, Centering Square and Rule can purchase the entire Right, when patented, very low, by addressing the inventor, C. M. LANE, Cincinnati, Ohio. 1*

TERRITORY FOR SALE.—THE "EUREKA BEE Hive," patented July 31, 1860, is now offered to the public, confident of its superiority over any other now in use. State, County and Township Rights for sale on reasonable terms. Apply to M. M'GONNIGLE, Patentee, No. 39 Union avenue, City of Allegheny, Allegheny County, Pa. 15 4*

HOW TO KEEP CHESTNUTS PURE, FRESH AND sweet from three to five years. Sent to any address for one dime or three three-cent postage stamps. JAMES H. DOUGHTY, Adamsville, Muskingum County, Ohio. 1*

TO LET, WITH STEAM POWER.—TWO OR THREE Lofts, 218 by 60 feet, in the large building known as the Pickle Works, above Yonkers, immediately on the Hudson. The premises are abundantly supplied with running water; also with freight accommodations by water or railroad. Apply to WELLES & PROVOST, No. 215 Front street, New York City. 15 2*

WATCHES.—A SYSTEM OF EIGHT-DAY WATCHES is now in preparation, and gages furnished to parties at their residences. Articles of contract gone into. Only eight day watches will be manufactured, on account of the small force required in the escape wheel. These are single-beat six-vibrators, with compensation balances. Three are in motion. Address J. MUMA, Hanover, Pa. 1*

CHEAPEST AND BEST WATER WHEEL IN AMERICA.—Adapted to all situations. Also the simplest power pumps. Manufactured by B. H. WAIT, at the Baker's Falls Iron Machine Works, Sandy Hill, N. Y. Send for circular. 15 2*

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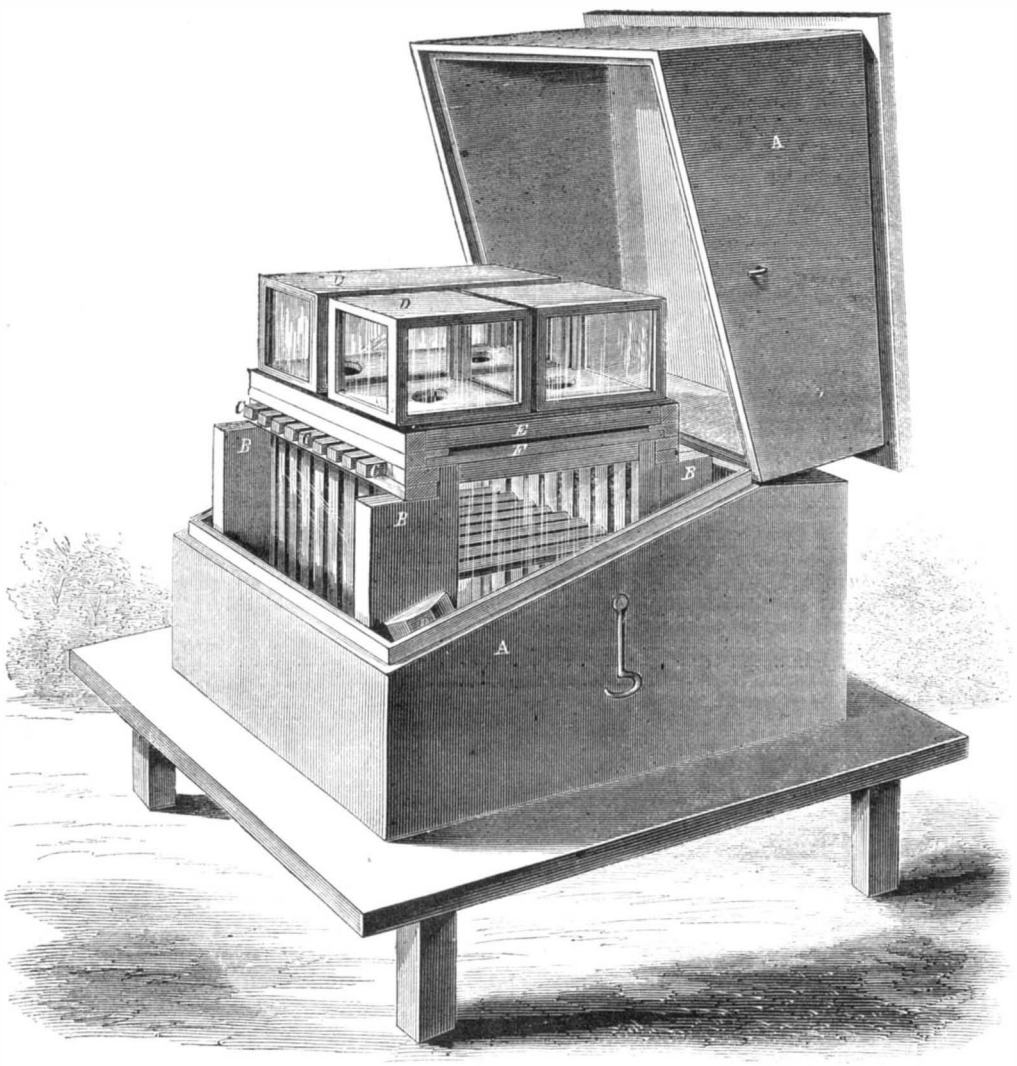
Improved Beehive.

It is well known that the honey bee stores its honey in cells made of wax, which are in the form of hexagonal prisms—the only form except the square or rectangular prism that occupies all the space. The bee arranges these cells in vertical sheets, formed of two series of horizontal cells, joined together at the base and opening outward on each side of the sheet. Several years ago Mr. Longstreth, a well-known investigator of the habits of the bee, and author of an excellent work on the subject, invented a movable frame for the bees to build their comb in, the hive to be filled with these frames at such a distance apart that the bees would build a sheet of comb in each frame; and thus any one frame might be removed with its honey without disturbing the remainder of the hive. The plan was found to facilitate materially the gathering of honey, and it has been extensively adopted. The accompanying engraving illustrates some modifications in the Longstreth hive, designed to obviate certain difficulties which have been discovered in the use of his and other hives.



M'GONNIGLE'S PATENT BEEHIVE.

The box, A A, of the hive is made in two parts, so that it may be opened, as shown, and into the lower part are fixed four uprights, B B B, for the support of the movable frames; each pair of uprights being connected by crossbars, on which the frames rest. The spaces between the uprights are filled to form a box; three of the sides being of glass and the other of wood. Two of the sides, or the ends, are secured in place by buttons, so that they may be readily removed, to permit the frames, *c c c*, to be taken out. The upper bars, *c c*, of the frames have projections fastened upon their sides of sufficient width to fill the space between the bars. This is the first feature of this invention. When one of the interior frames is taken from a Longstreth hive, it is necessary to slip the adjacent frames from their places, and in this operation there is great danger of pushing them nearer together, and crushing the bees which may be on their sides; and it will be seen that this danger is completely avoided by the projections spoken of.

Above the frames are placed the glass-sided boxes, D D, usually employed for collecting choice honey in the comb, and the mode in which the communication to these is adjusted to admit the workers and exclude the queen bee, forms the second feature in this invention. Over the frames is placed a cover, formed of two thin boards, E and F, the lower of which communicates by long openings with the spaces between the comb frames, while the upper communicates by holes with the boxes, D D. The space between the boards, E and F, is made $\frac{5}{32}$ of an inch in width, the width which has been found to allow the workers to pass, but to be too narrow for the body of the queen. The object of prohibiting the queen bee from ascending into the honey boxes is to prevent her from carrying off a small colony late in the season, when it could not gather a sufficient quantity of honey to subsist on through the winter.

When a small colony is swarmed there is danger of its perishing by cold, in consequence of the bees being too much scattered through a large hive. In the hive here illustrated this evil may be avoided by contracting the dimensions of the hive. It is only necessary to take out a portion of the frames, and move the glass ends more nearly together The infant colony may be fed at the same time by substituting one or two frames filled with honey for those that are empty.

A premium and diploma were awarded for this hive by the Allegheny County Agricultural Society, in September, 1860. The patent for the invention was granted July 31, 1860, and for the purchase of rights, or for any further information address may be made to the inventor, Matthias McGonnigle, No. 39 Union avenue, Allegheny, Pa.

Chicago Reaping Machine for the World's Fair.—The *Prairie Farmer* states that Mr. C. H. M'Cormick, of Chicago, has completed one of his celebrated Mowers and Reapers, for exhibition at the World's Fair. Every piece of workmanship is polished in the highest style. The wood work is of ash, and only varnished, being striped with gold, showing the grains of the wood to perfection. A self-rake is attached to the machine. It has been on exhibition for a few days, and visited by a large number of citizens.

Hay and Corn Shrinkage by Drying.—The loss upon hay weighed July 20, when cured enough to put in the barn, and again February 20, has been ascertained to be 27½ per cent. So that hay at $15 a tun in the field is equal to $20 and upward when weighed from the mow in winter. The weight of cobs in a bushel of corn in November ascertained to be 19 lbs., was only 7½ lbs. in May. The cost of grinding a bushel of dry cobs, counting handling, hauling and Miller's charge, is about one cent a pound. Is the meal worth the money?

Mr. Alfred Guthrie, of Chicago, Ill., has been appointed steamboat inspector in place of Isaac Lewis removed.

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